

August 23, 2019

Ms. Karen McGuire  
USEPA Region 1 – New England  
Mail Code OES04-5  
Boston, MA 02109-3912

Mr. Kevin Brander P.E., Section Chief  
Wastewater Management Section  
MA Department of Environmental Protection  
Northeast Regional Office  
205B Lowell Street  
Wilmington, MA 01887

**RE: Massachusetts Water Resources Authority NPDES Permit Number MA0103284 – MWRA  
Annual Infiltration and Inflow (I/I) Reduction Report for Fiscal Year 2019**

Dear Ms. McGuire and Mr. Brander:

In compliance with the requirements of MWRA's NPDES Permit MA0103284 - Part I, Item 18.bb (ii) "Infiltration/Inflow" (page 28 of 32), the Authority submits this cover letter and the six Attachments listed below that together comprise the MWRA Annual Infiltration and Inflow (I/I) Reduction Report for Fiscal Year 2019.

Attachment 1 – Overview of MWRA Regional I/I Reduction Plan  
Attachment 2 – MWRA Regional I/I Reduction Plan – FY19 Progress Update and Detailed  
Implementation Schedule for FY20 Activities  
Attachment 3 – MWRA Actions Taken to Reduce I/I During FY19  
Attachment 4 – Status Update on MWRA's I/I Local Financial Assistance Program  
Attachment 5 – I/I Reduction Status Update for Member Communities  
Attachment 6 – CY18 Community Wastewater Flow Data

Should you require additional information, please contact Carl H. Leone, Senior Program Manager, Community Support Program at (617) 788-4356.

Sincerely,

David W. Coppes, P.E.  
Chief Operating Officer

cc: David Butler, MassDEP, NERO  
Betsy Reilley, Director, MWRA, Environmental Quality  
Wendy Leo, Senior Program Manager, MWRA, Environmental Quality  
Carl H. Leone, Senior Program Manager, MWRA, Community Support Program

ATTACHMENT 1  
TO  
MWRA ANNUAL I/I REDUCTION REPORT FOR FY19  
Reporting Period – July 2018 Through June 2019

## OVERVIEW OF MWRA REGIONAL I/I REDUCTION PLAN

The MWRA Board of Directors approved the Regional Infiltration/Inflow (I/I) Reduction Plan on May 23, 2001 and authorized staff to submit the Plan to EPA and MassDEP as required under MWRA's NPDES Permit. The plan was submitted to EPA and MassDEP in June 2001 and MassDEP approved the plan in a letter dated November 19, 2002. A full copy of the Regional I/I Reduction Plan (dated September 2002) was included as Attachment 2 to the August 29, 2003 MWRA Annual I/I Reduction Report for FY03. The Regional I/I Reduction Plan is available at <http://www.mwra.com/comsupport/communitysupportmain.html>.

The Regional I/I Reduction Plan combines recommendations from the I/I Task Force Report (March 2001) with ongoing MWRA I/I reduction initiatives. The updated plan replaces the Authority's 1990 I/I Reduction Policy. Implementation of the Regional I/I Reduction Plan focuses on the cooperative efforts of member communities, MassDEP, EPA and MWRA to develop and implement I/I reduction and sewer system rehabilitation projects.

Under the plan, MWRA has full legal and fiscal responsibility for implementation of operation, maintenance, and I/I reduction programs for the MWRA-owned interceptor system. Each member community retains full legal and fiscal responsibility for implementation of operation, maintenance and I/I reduction programs for community-owned sewers. MWRA will provide technical and financial assistance to member communities and work cooperatively with MassDEP, EPA and other stakeholders to help solve local and regional sewer problems. MWRA's Regional I/I Reduction Plan is organized into five major goals:

1. MWRA will continue its current operation and maintenance program for the MWRA-owned interceptor system leading to the identification, prioritization and rehabilitation of structural and I/I problems.
2. MWRA will work cooperatively with member communities, MassDEP and EPA to eliminate sewer system backups into homes and other buildings and to minimize health and environmental impacts of SSOs related to I/I.
3. MWRA will work cooperatively with member communities, MassDEP and EPA to reduce I/I in the regional collection system with emphasis on the following: (1) inflow reduction in areas tributary to sewer backups and SSOs, (2) private source inflow reduction, (3) infiltration that may impact groundwater or surface water resources, and (4) excessive infiltration as defined in MassDEP regulations or guidance documents.
4. MWRA will work cooperatively with member communities, MassDEP and EPA to expand existing efforts to educate and involve the public regarding regional sewer backup, SSO and I/I reduction issues.
5. MWRA will provide technical assistance and work cooperatively with member communities, MassDEP and EPA regarding guidance on local operation and maintenance and capital improvement programs intended to provide a reasonable level of sewer service to local sewer users/ratepayers.

ATTACHMENT 2  
TO  
MWRA ANNUAL I/I REDUCTION REPORT FOR FY19  
Reporting Period – July 2018 Through June 2019

**MWRA REGIONAL I/I REDUCTION PLAN -  
FY19 PROGRESS UPDATE AND DETAILED  
IMPLEMENTATION SCHEDULE FOR FY20 ACTIVITIES**

This document provides a progress update for FY19 accomplishments and a description of the activities to be accomplished during FY20 for each of the I/I reduction strategies in the MWRA Regional I/I Reduction Plan. The update appears in bold type directly below each I/I reduction strategy. This document is intended to satisfy condition 5 of DEP's November 19, 2002 letter approving the MWRA Regional I/I Reduction Plan.

Goal 1 under MWRA's Regional I/I Reduction Plan is:

*MWRA will continue its current operation and maintenance program for the MWRA-owned interceptor system leading to the identification, prioritization, and rehabilitation of structural and I/I problems.*

*Strategy A:* Utilize MWRA's internal TV inspection equipment that currently includes one fully outfitted internal TV inspection vehicles equipped with 6000 feet of multi-conductor cable. MWRA also utilizes an OZ-camera that has a 200X zoom capability. Annual inspection schedules are outlined in MWRA's Collection System O&M Manual. This strategy has an ongoing schedule that has been initiated.

*Strategy B:* Utilize MWRA's sonar camera to inspect siphons and force mains. Annual inspection schedules are outlined in MWRA's Collection System O&M Manual. This strategy has an ongoing schedule that has been initiated.

*Strategy C:* Physical inspection of collection system manholes and structures by Operations Division field crews. Annual inspection schedules are outlined in MWRA's Collection System O&M Manual. This strategy has an ongoing schedule that has been initiated.

**Work by MWRA under these three Strategies is ongoing.**

**During FY19, MWRA properly operated and maintained the MWRA-owned interceptor system. Annual performance targets and ongoing accomplishments are tracked as part of the Authority's MAXIMO maintenance database and are reported monthly to MWRA senior management. Specific activities undertaken by MWRA for FY19 are detailed in Attachment 3. Additional information on MWRA's FY19 maintenance activities is provided under separate submittal - NPDES Part I.18.g Annual Maintenance Status Sheets.**

**During FY20, MWRA will continue to properly operate and maintain the MWRA-owned interceptor system.**

Goal 2 under MWRA's Regional I/I Reduction Plan is:

*MWRA will work cooperatively with member communities, DEP, and EPA to eliminate sewer system backups into homes and other buildings and to minimize health and environmental impacts of SSOs related to I/I.*

**Strategy A:** MWRA will provide technical assistance to DEP to develop a uniform format for use by communities for reporting wastewater backup and sewer system overflow information. A representative group of communities should be consulted for review. MWRA will provide technical assistance to DEP to develop a system to record the information reported by communities into a usable database format. This database may have the capability to be linked to GIS mapping and the information may be made available to communities, MWRA, DEP, EPA, watershed groups, the general public, etc. upon appropriate request. This strategy has an ongoing schedule that should be initiated in the short-term. Completion of this strategy requires a significant resource commitment by DEP. Collection and recording of sewer backup and SSO information from member community sewer systems is the responsibility of DEP. DEP will be responsible for management of collection and distribution of these records. (Cross-reference this strategy to the I/I Task Force Report recommendations 4.1 Strategy A-2 and 5.2 Strategy B-2)

**Work by MWRA under this Strategy is complete as noted below.**

**During spring 2001 MWRA provided MassDEP a draft SSO reporting/record keeping electronic database format that was developed by Malcolm-Pirnie, Inc. under contract to MWRA. This work was completed by MWRA as technical assistance to MassDEP. A follow-up letter dated June 20, 2001 requested MassDEP identify the format for finalizing the SSO reporting/record keeping electronic database.**

**During FY04, MassDEP (in conjunction with staff in the Massachusetts Information Technology Division), developed a revised format SSO electronic database package. This project was part of statewide efforts to upgrade computerized resources and electronic access. The system was demonstrated at an April 8, 2004 MassDEP/MWRA joint community workshop.**

**In May 2005, MassDEP developed a revised Reporting Form "Sanitary Sewer Overflow/Bypass/Backup Notification Form (rev 05/2005)." This form was made available on the MassDEP web site and reporting was via FAX or by mail. Following development of the web based reporting form by MassDEP, rollout of the SSO reporting/record keeping electronic database was not completed.**

**In January 2013, MassDEP developed the most recent revised Reporting Form "Sanitary Sewer Overflow (SSO)/Bypass Notification Form" (pdf version - rev 01/2013). As of July 2019, this pdf form is available on the MassDEP web site (a Word version of the form is also available – rev 1/2018) and reporting using the form is via FAX or by mail.**

**As requested by MassDEP, on August 22, 2011 MWRA provided MassDEP specific SSO site location information for SSO's on MWRA-owned northern system sewers (for events during the period January 2000 through June 2011), including street location, longitude and latitude location, and GIS site maps.**

**During FY16, MWRA added more specific information on SSOs on the MWRA web site at: <http://www.mwra.com/03sewer/html/sso.html>. This information includes information on what an SSO is, public health impacts, how SSOs can be prevented, and what MWRA does when an SSO occurs. The web site also includes an interactive GIS site map for SSOs that have been reported by MWRA for the following SSO event display selections: currently active, past 2 days, past 30 days, and past 12 months.**

*Strategy B:* Once a central information database is established (see Strategy A), MWRA will periodically delineate areas which may be “at risk” for backups and SSOs that may be impacted by the MWRA-owned collection system. MWRA will evaluate potential improvements to the MWRA-owned collection system that may reduce the risk of sewer backups and SSOs. This strategy should be completed in the mid to long-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 4.3 Strategy C-2 and 5.5 Strategy E-2)

**Work by MWRA under this Strategy is complete as noted below. Some ongoing work performed by MWRA that is associated with this Strategy is also noted.**

**MWRA utilizes MassDEP’s Sanitary Sewer Overflow (SSO)/Bypass Notification Form to report SSOs from MWRA’s collection system.**

**MWRA does not have SSOs related to dry weather sewer system capacity issues. MWRA does not have SSOs related to wet weather sewer capacity issues for rainfall events at or below the MassDEP recommended standard design storm for inflow having a one-year recurrence interval and a duration of six hours (see MassDEP’s Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys – Revised May 2017). The one-year, six-hour storm produces approximately 1.72 inches of rainfall in the Boston area. During extreme storm events that exceed the MassDEP recommended design storm, I/I entering the upstream community-owned collection systems may cause an occasional SSO in the MWRA regional interceptor system.**

**During FY19, MWRA continued its ongoing priority program to clean and inspect all inverted siphons in the MWRA-owned collection system. This program is intended to minimize potential SSOs upstream of siphons and reduce the risk of hydraulic limitations and/or blockage from debris buildup in siphon barrels. The cleaning and inspection program will continue in FY20.**

*Strategy C:* Once a central information database is established (see Strategy A) and member communities have delineated areas which may be “at risk” for backups and SSOs, MWRA - jointly with DEP - will provide technical assistance to member communities to evaluate potential improvements to local infrastructure that may reduce the risk of sewer backups and SSOs. MWRA will assist communities to determine if impacts from the regional collection system are an issue. The schedule for this strategy is dependent on prior actions by DEP and member communities. (Cross-reference this strategy to the I/I Task Force Report recommendations 4.3 Strategy C-1 and 5.5 Strategy E-1)

**MassDEP’s roll-out of the SSO reporting/record keeping electronic database was not completed (see Strategy A above).**

**As part of its ongoing program to support member community I/I reduction and sewer system rehabilitation programs, MWRA offers technical assistance to communities to review local I/I reduction plans and local/regional SSO problems. MWRA also offers member communities financial assistance for I/I reduction projects. During FY20, at the request of member communities, MWRA will continue to provide technical and financial assistance on local sewer system projects.**

*Strategy D:* For the MWRA-owned interceptor system, MWRA will review and analyze the health and environmental impacts of existing SSO sites. SSO sites will be prioritized based on the frequency and duration of activations and the resulting health and environmental impacts, including: potential for human contact, impact to water supply, impact to shellfish beds or other economic resources, impact to animal or aquatic habitat, etc. This strategy will be completed in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.3 Strategy C-1)

**Work by MWRA under this Strategy is complete. As previously stated, MWRA does not have SSOs related to dry weather sewer system capacity issues. MWRA also does not have SSOs related to wet weather sewer capacity issues for rainfall events at or below the MassDEP recommended standard design storm for inflow having a one-year recurrence interval and a duration of six hours (see MassDEP's Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys – Revised May 2017). Since prior SSOs have been eliminated for sewer capacity issues at or below the collection system design standard for inflow, additional work under this strategy is not necessary.**

*Strategy E:* Utilizing the priority ranking to be completed in Strategy D above, as well as system hydraulic analyses, MWRA (for the MWRA-owned interceptor system) - in conjunction with DEP and EPA - will evaluate the potential to eliminate each overflow. Appropriate I/I reduction and/or relief sewer projects that may eliminate (or minimize) SSOs from MWRA-owned interceptors will be evaluated. This strategy will be initiated in the short to mid-term; however, implementation of projects developed from the evaluation may span beyond the long-term time frame as defined within the Regional I/I Reduction Plan. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.3 Strategy C-2)

**Work by MWRA under this Strategy is complete as noted below. Some ongoing work that is associated with this Strategy is also noted.**

**As previously stated, MWRA does not have SSOs related to dry weather sewer system capacity issues. MWRA also does not have SSOs related to wet weather sewer capacity issues for rainfall events at or below the MassDEP recommended standard design storm for inflow having a one-year recurrence interval and a duration of six hours (see MassDEP's Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys – Revised May 2017). Since prior SSOs have been eliminated for sewer capacity issues at or below the collection system design standard for inflow, additional work under this strategy is not necessary.**

**During FY14 (as of April 25, 2014), MassDEP revised its Regulation 314 CMR 12.00 *Operation, Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers*. The revisions include a requirement for all public entities that own a sewer system to complete an I/I analysis by December 31, 2017 and submit it to MassDEP for review. The analysis also must include an assessment of the risk of SSOs.**

**As part of its ongoing program to support member community I/I reduction and sewer system rehabilitation programs, MWRA offers technical assistance to communities to review local I/I reduction plans and local/regional SSO problems. MWRA also offers member communities financial assistance for I/I reduction projects. During FY20, at the request of member communities, MWRA will continue to provide technical and financial assistance on local sewer system projects. MWRA will also continue to work on projects in the MWRA Capital Improvement Program, as summarized in Attachment 3.**

*Strategy F:* For those overflows that are unlikely to be eliminated in the short to mid-term (based on the evaluation from Strategy E, above), MWRA (for the MWRA-owned interceptor system) will consider developing interim measures to relocate or otherwise mitigate the impact of existing overflows on human and natural resources. The priority ranking (from Strategy D, above) will be utilized in development of interim mitigation measures. This strategy has an ongoing schedule that should be initiated in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.3 Strategy C-3)

**Work by MWRA under this Strategy is ongoing.**

**As previously stated, MWRA does not have SSOs related to dry weather sewer system capacity issues. MWRA also does not have SSOs related to wet weather sewer capacity issues for rainfall events at or below the MassDEP recommended standard design storm for inflow having a one-year recurrence interval and a duration of six hours (see MassDEP's Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys – Revised May 2017). The one-year, six-hour storm produces approximately 1.72 inches of rainfall in the Boston area.**

**During FY19, MWRA continued its ongoing priority program to clean and inspect all inverted siphons in the MWRA-owned collection system. This program is intended to minimize potential SSOs upstream of siphons and reduce the risk of hydraulic limitations and/or blockage from debris buildup in siphon barrels. The cleaning and inspection program will continue in FY20.**

**During extreme storm events that exceed the MassDEP recommended standard design storm for inflow, I/I entering the upstream community-owned collection systems may cause an occasional SSO in the MWRA regional interceptor system. Continued coordination with member communities to reduce I/I from local collection systems will help to minimize SSOs that may occur during extreme storm events. Most recently (beginning in FY19), an additional \$200 million in 75% grants and 25% interest-free loans was added as Phases 11 and 12 (\$100 million for each Phase) of the I/I Local Financial Assistance Program to help fund community I/I reduction projects. MWRA also enhanced the community I/I funding program by adding a \$100 million loan only Phase 13 as an additional resource for the communities most aggressively utilizing the MWRA financial assistance program. MWRA's commitment to fund local sewer rehabilitation projects under the I/I Local Financial Assistance Program totals \$760.75 million. Through FY19, \$401 million in grants and interest-free loans has been distributed to 43 member sewer communities to fund 574 local projects (see details in Attachment 4).**

*Strategy G:* MWRA will assist DEP, member communities, and other regional stakeholders to inform local plumbing inspectors of the regional priority of eliminating sewer system backups. Plumbing inspectors will be requested to work more closely with local DPW staff to identify sewer system backup problem areas and locations where backflow prevention devices may be required. MWRA expects to meet this strategy by distributing a letter to the plumbing inspector in each member community that discusses sewer backups, potential public health impacts, backflow prevention, and coordination with the local DPW to identify problem areas. This strategy will be completed in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 4.2 Strategy B-4)

**Work by MWRA under this Strategy is complete as noted below.**

**On September 26, 2005, MWRA distributed an informational package on Sewer Backups and Sanitary Sewer Overflows to all service area community plumbing inspectors, Health Departments (Boards of Health), DPW Directors, Engineering Departments, and collection system operators. The package included information from fourteen separate sources and provided many web links for additional information. On September 29, 2005, MWRA sent a copy of the informational package to EPA, MassDEP, all MWRA water-only member communities, and local watershed associations. Currently this type of information is widely available via the internet.**

**Specific information on SSOs and backups into homes is provided on the MWRA web site at: <http://www.mwra.com/03sewer/html/sso.html>. This site includes information on what an SSO is, public health impacts, how SSOs can be prevented, and what MWRA does when an SSO occurs. Links on the site include:**

- **DEP's Home Care Guide on Flooding and Sewage Backups;**
- **Cleanup Procedures After a Sewer Backup, from the Boston Water and Sewer Commission; and,**
- **FEMA and Red Cross Guide on Flooded Property Hazards and Repair.**



Goal 3 under MWRA's Regional I/I Reduction Plan is:

*MWRA will work cooperatively with member communities, DEP, and EPA to reduce I/I in the regional collection system with emphasis on the following: (1) inflow reduction in areas tributary to sewer backups and SSOs, (2) private source inflow reduction, (3) infiltration that may impact groundwater or surface water resources, and (4) excessive infiltration as defined in DEP regulations or guidance documents.*

*Strategy A:* MWRA will continue to analyze available MWRA wastewater metering data to estimate community infiltration and inflow rates. MWRA will provide this information along with technical assistance to help interpret the information to member communities. This strategy has an ongoing schedule that has been initiated. (Cross-reference this strategy to the I/I Task Force Report recommendations 6.1 Strategy A-1, and 7.1 Strategy A-1).

**Work by MWRA under this Strategy is ongoing.**

**During FY19, MWRA continued to estimate community infiltration and inflow rates on a bimonthly basis. Community wastewater flow data for CY18 is included as Attachment 6. These flow data tables are available to all users on MWRA's web site. Community wastewater flow rate basis data is distributed to member communities throughout the year on a bimonthly basis. \$15.8 million in funds for the next phases of the wastewater meter replacement/upgrade project are programmed in MWRA's Capital Improvement Program during FY18-23. An additional \$12.9 million for meter equipment asset protection is programmed through FY31.**

**During FY20, MWRA will continue to estimate community infiltration and inflow rates on a bimonthly basis and make this information available to MWRA member communities. MWRA will provide the information to EPA and MassDEP as part of the annual summary report on actions taken to reduce I/I (submitted annually by September 1 per the Deer Island Treatment Plant NPDES Permit).**

*Strategy B:* MWRA, in cooperation with member communities, will evaluate the feasibility of developing and operating an expanded emergency notification system (ENS). Currently, the MWRA remotely monitors wastewater flow at key locations within the regional collection system before and during wet weather events. Interested communities are notified when sewer system depths reach critical levels. The Authority and member communities use this information to forecast problem areas, predict potential sewer system overflows and deploy work crews. The MWRA's wastewater metering system will be upgraded over the next few years. This upgrade may impact the ENS. MWRA is also investigating, over the next three to five years, the benefits of adding SCADA-type meters at some key locations in the collection system. After completion of the two ongoing projects, MWRA will evaluate whether an ENS system can be used efficiently to provide information at the local level. This strategy will be completed in the long-term or more extended time frame subject to the schedule of the ongoing projects noted above. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.4 Strategy D-1)

**Work by MWRA under this Strategy is complete as noted below.**

**MWRA's Wastewater Meter Replacement project was completed in FY06. The system continues to be used to monitor wastewater flow at key locations within the regional collection system before and during wet weather events. Interested communities are notified when sewer system depths reach critical levels.**

**During FY18, MWRA began the next Wastewater Metering System upgrade project with a complete review of metering equipment and software technologies, review of MWRA's community metering methodologies, and subsequent design and construction of upgrades. \$15.8 million in funds for the next phases of the wastewater meter replacement/upgrade project are programmed in MWRA's Capital Improvement Program during FY18-23. An additional \$12.9 million for meter equipment asset protection is programmed through FY31.**

*Strategy C:* MWRA will provide technical assistance to member communities to establish written infiltration and inflow identification and removal programs as outlined in the I/I Task Force Report. This strategy has an ongoing schedule that will be initiated in the short to mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 6.1 Strategy A-1, and 7.1 Strategy A-1)

**Work by MWRA under this Strategy is ongoing.**

**During FY14 (as of April 25, 2014), MassDEP revised its Regulation 314 CMR 12.00 *Operation, Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers*. The revisions include a requirement for all public entities that own a sewer system to complete an I/I analysis by December 31, 2017 and submit it to MassDEP for review. The analysis also must include an assessment of the risk of SSOs.**

**During FY19, MWRA staff continued to meet with community representatives to provide technical assistance and discuss local programs. Communities are often interested in utilizing MWRA wastewater meter data and flow component analyses for local I/I and SSES studies. Communities also discuss what sewer system rehabilitation actions other communities are pursuing. MWRA's Advisory Board Operation Committee meetings, as well as Wastewater Advisory Committee (WAC) meetings, are used as platforms for member communities to share information on projects and lessons learned. All member sewer communities are actively participating in MWRA's \$760.75 million I/I Local Financial Assistance Program (see Attachment 4). Community I/I reduction programs are generally being conducted by local engineering consultants under contract to the communities. These projects generally utilize standards established in MassDEP's May 2017 I/I Guidelines. This work will continue in FY20.**

*Strategy D:* MWRA will provide technical assistance to member communities that seek to emphasize infiltration removal that may impact groundwater and surface water resource areas. MWRA will provide GIS mapping information to member communities that identifies water resource areas, provides an overlay of local and regional sewers, and delineates watersheds. The I/I Task Force Report recommends communities target areas where infiltration reduction will provide the most meaningful benefit for aquifer recharge, stream flow, wetlands and water levels in lakes and ponds. The Task Force also recommends communities coordinate their infiltration reduction efforts with appropriate EOE Watershed Teams, local watershed groups and the local conservation commission. Distribution of MWRA mapping information is intended to assist member communities in fulfilling this I/I Task Force recommendation. This strategy has an

ongoing schedule that will be initiated in the short to mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 7.1 Strategy A-5)

**Work by MWRA under this Strategy is complete as noted below. Some ongoing work performed by MWRA that is associated with this Strategy is also noted. Additional community technical assistance is provided upon request as noted under Strategy C, above.**

**During FY05, MWRA completed a major upgrade to its electronic sewer database and GIS mapping system. Also during FY05, MWRA completed coordination with local communities to more accurately map connection points of local sewers to the MWRA interceptor system and GPS located all wastewater meter sites. Significant GIS mapping upgrades were rolled-out in FY06. In July 2006, MWRA provided GIS maps with detailed water resource information overlaid with the local sewer system to each MWRA member sewer community. In addition, land use mapping was also distributed to the communities. The distribution of this GIS mapping information fulfilled MWRA's work under Strategy D.**

**Beginning in FY14 and continuing through FY19, MWRA updated prior (or developed new) GIS mapping information partnership agreements with most MWRA member water and sewer communities to share MWRA/community GIS mapping data. Under the partnership agreements, MWRA and member communities have signed nondisclosure agreements that detail security protocols necessary to safeguard water and sewer system data. MWRA continues to coordinate with member communities to add GIS partners and update existing data. This work will continue in FY20.**

*Strategy E:* MWRA, in coordination with the MWRA Advisory Board, will continue to fund the I/I Local Financial Assistance Program to provide grants and loans to member sewer communities to fund local I/I reduction projects. Through September 2002, MWRA has authorized a total budget of \$140.75 million to fund this program. Financial assistance is provided through 45 percent grants and 55 percent interest-free loans for eligible projects. The MWRA Board of Directors has approved the program through FY2010. The I/I Local Financial Assistance Program is fully detailed in the "Program Guidelines" document available from the MWRA Community Support Program. This strategy has an ongoing schedule that has been initiated. (Cross-reference this strategy to the I/I Task Force Report recommendation 10.2 Strategy B-1)

**Work by MWRA under this Strategy is ongoing.**

**In June 2004, the MWRA Board of Directors approved an additional \$40 million (\$18 million in grants and \$22 million in interest-free loans) to increase the total I/I Local Financial Assistance Program budget to \$180.75 million and extended program distribution through FY13. The additional \$40 million (Phase 5) in financial assistance funds became available to the communities in FY05.**

**In June 2006, the MWRA Board of Directors approved an additional \$40 million (\$18 million in grants and \$22 million in interest-free loans) to increase the total I/I Local Financial Assistance Program budget to \$220.75 million and extended program distributions through FY15. The additional \$40 million (Phase 6) in financial assistance funds became available to the communities in FY07.**

**In June 2009, the MWRA Board of Directors approved an additional \$40 million (\$18 million in grants and \$22 million in interest-free loans) to increase the total I/I Local Financial Assistance Program budget to \$260.75 million and extended program distributions through FY18. The additional \$40 million (Phase 7) in financial assistance funds became available to the communities in FY10.**

**In June 2012, the MWRA Board of Directors approved an additional \$40 million (\$18 million in grants and \$22 million in interest-free loans) to increase the total I/I Local Financial Assistance Program budget to \$300.75 million and extended program distributions through FY21. The additional \$40 million (Phase 8) in financial assistance funds became available to the communities in FY13.**

**In June 2014, the MWRA Board of Directors approved an additional \$160 million (\$120 million in 75% grants and \$40 million in 25% interest-free 10-year loans) to increase the total I/I Local Financial Assistance Program budget to \$460.75 million and extended program distributions through FY25. The additional \$160 million (\$80 million each for Phases 9 and 10) in financial assistance funds became available to the communities in FY15. Note that MWRA enhanced Phase 9 and 10 of its grant/loan community funding program by increasing the grant portion from 45% to 75%. Also, the loan portion repayment period was extended from 5 to 10 years.**

**In June 2018, the MWRA Board of Directors approved an additional \$200 million (\$150 million in 75% grants and \$50 million in 25% interest-free 10-year loans) to increase the total I/I Local Financial Assistance Program budget to \$660.75 million and extended program distributions through FY30. The additional \$200 million (\$100 million each for Phases 11 and 12) in financial assistance funds became available to the communities in FY19. Also in June 2018, the MWRA Board of Directors approved an additional \$100 million 10-year loan only Phase 13 to be used by communities once their grant/loan funds are all distributed. As of FY19, MWRA's commitment to fund local sewer rehabilitation projects under the I/I Local Financial Assistance Program totals \$760.75 million.**

**During FY19, MWRA continued to provide grants and loans to member sewer communities to fund local I/I reduction and sewer system rehabilitation projects. A total of \$46.4 million was distributed during FY19. Since program inception in May 1993, \$401 million has been distributed to fund 574 local projects. The program Guidelines, Financial Assistance Application, and summary of available funds by community are posted on the MWRA Community Support Program web page at <http://www.mwra.com/comsupport/communitysupportmain.html>. A status update on MWRA's I/I Local Financial Assistance Program is included as Attachment 4.**

**During FY20, MWRA will continue to distribute funds and assist communities in the management of projects under the I/I Local Financial Assistance Program. MWRA's remaining financial assistance funds are authorized for distribution through FY30.**

*Strategy F:* MWRA, in coordination with the MWRA Advisory Board, will continue to provide emergency assistance to member communities for sewer services on local collection systems that are routinely performed by MWRA staff for the MWRA-owned interceptor system. Examples of past community assistance provided by MWRA staff include: emergency response assistance, bypass pumping, internal TV inspection, sewer cleaning, flow metering, engineering technical assistance, etc. This strategy has an ongoing schedule that has been initiated. (Cross-reference this strategy to the I/I Task Force Report recommendations 9.6 Strategy F-2, and 10.2 Strategy B-2)

**Work by MWRA under this Strategy is ongoing.**

**During FY19, MWRA continued to provide emergency assistance to member communities, as requested. These efforts typically included internal TV inspection of local sewers and associated sewer cleaning, as well as other emergency assistance. During FY20, MWRA will continue to provide emergency assistance to member communities.**

Goal 4 under MWRA's Regional I/I Reduction Plan is:

*MWRA will work cooperatively with member communities, DEP, and EPA to expand existing efforts to educate and involve the public regarding regional sewer backup, SSO, and I/I reduction issues.*

**Strategy A:** MWRA will act as a "clearinghouse" to collect and distribute information on I/I and SSO issues. Other groups, agencies, associations, community representatives, and local citizens wishing to disseminate information on I/I and SSO issues within the region can provide a copy to MWRA that will be copied and distributed. MWRA staff will maintain a database of contacts with Federal, State and community officials, as well as, local associations and individuals that wish to stay informed on I/I and SSO issues. Summary mailings will be made periodically. MWRA, in coordination with the MWRA Advisory Board, will also act as a clearinghouse to inform regional stakeholders about the progress of efforts to increase state and federal funding for I/I reduction and SSO projects. Regional stakeholders will be advised on the most appropriate time to provide input and lobbying efforts. This strategy has an ongoing schedule that will be initiated in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 8.1 Strategy A-1, 10.4 Strategy C-5, and 10.4 Strategy D-2)

**Work by MWRA under this Strategy is ongoing including information on both wastewater and water systems.**

**During FY19, MWRA distributed technical information to member community Public Works Directors, City/Town Engineers, local wastewater/water system operators, community consultants, and local watershed groups, including:**

- **MWRA continued to estimate community infiltration and inflow rates on a bimonthly basis. Community wastewater flow data for CY18 is included as Attachment 6. These flow data tables are available to all users on MWRA's web site. Community wastewater flow rate basis data is distributed to member communities throughout the year on a bimonthly basis.**
- **July 11, 2018, MWRA staff distributed correspondence to all sewer communities announcing the MWRA's \$300 million Phase 11, 12, and 13 expansions of the I/I Local Financial Assistance Program with a link to the MWRA Community Support Web page for more information.**
- **July 18, 2018, MWRA Board of Directors approved the staff summary recommendation to extend the sunset date for Malden's Phase 6 grant allocation six months to December 30, 2018. All Staff Summaries to the MWRA Board of Directors are posted on MWRA web site at [www.mwra.com](http://www.mwra.com).**
- **October 22, 2018, MWRA staff provided all communities an update on the Water System Leak Detection Services (Task Order) Contract that communities can utilize to help find leaks in their water systems.**
- **March 14, 2019, Local Water System Assistance Program funding (interest-free 10-year loans) update e-mails were distributed to each member community and information on MWRA's Lead Service Line Replacement Loan Program was included.**

- **March 20, 2019, MWRA staff provided an update presentation on the I/I Local Financial Assistance Program to the MWRA Board of Directors. All Staff Summaries to the MWRA Board of Directors are posted on MWRA web site at [www.mwra.com](http://www.mwra.com).**
- **March 20, 2019, MWRA staff provided an update presentation on the Local Water System Assistance Program to the MWRA Board of Directors. All Staff Summaries to the MWRA Board of Directors are posted on MWRA web site at [www.mwra.com](http://www.mwra.com).**
- **March 21, 2019, MWRA staff distributed an announcement letter on water conservation educational materials and low-flow device retrofit kits available from MWRA at no cost to member communities, local customers, watershed associations, environmental groups, housing authorities, condo associations, etc.**
- **April 16, 2019, MWRA staff distributed correspondence to all sewer communities with an update on funds available under the I/I Local Financial Assistance Program (grant/loan funds) and requested information on the community's projected three year spending plan.**
- **Early-July 2019, annual community I/I questionnaires were distributed to member sewer communities to acquire information on FY19 local I/I reduction programs for development of MWRA's Annual I/I Reduction Report (see Attachment 5).**

**During FY20, MWRA will continue to distribute information on I/I and SSO issues, as appropriate.**

*Strategy B:* MWRA will develop and distribute a summary of previous information/technology distributions regarding I/I reduction and SSOs. The summary will be organized by topic and distributed to all regional stakeholders in MWRA's database of contacts. This summary can be used as a tool to help reference previously distributed information. This strategy will be completed in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.1 Strategy A-2)

**Work by MWRA under this Strategy is complete as noted below.**

**On August 8, 2007, MWRA distributed a Technical Transfer Summary package that included lists of previously distributed information under five separate topic headings: (1) Reports, Handbooks, and Guidelines; (2) Sewer Back-ups, SSOs, and Flooding; (3) Public Source I/I Reduction; (4) Private Source I/I Reduction; and (5) Brochures and Bill Stuffers. Additional information/technology distributions will continue under Strategy A, above.**

*Strategy C:* MWRA, jointly with DEP (and possibly other regional organizations), will organize periodic demonstration projects and/or workshops to bring together regulators, community representatives, vendors, environmental groups, consultants, contractors, etc. Workshops may cover topics such as: new or revised regulations, I/I reduction technologies, updates/progress on Task Force Report recommendations, etc. MWRA and DEP conducted a joint workshop on private source inflow reduction during November 2001. Lessons learned from this

workshop will help shape future efforts under this strategy. Completion of this strategy requires a significant resource commitment by DEP. This strategy has an ongoing schedule that will be initiated in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 8.1 Strategy A-3 and 8.2 Strategy B-6)

**Work by MWRA under this Strategy is ongoing. Following-up on the joint workshop in 2001, additional joint workshops were held in 2002 and 2004.**

**On April 27, 2011, representatives from MassDEP, EPA, and MWRA met to discuss I/I reduction in the region. The potential for future workshops was noted, but no specific plans have been developed for organizing additional joint workshops.**

**During FY14 (as of April 25, 2014), MassDEP revised its Regulation 314 CMR 12.00 *Operation, Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers*. The revisions included a requirement for all public entities that own a sewer system to complete an I/I analysis by December 31, 2017 and submit it to MassDEP for review. The analysis also must include an assessment of the risk of SSOs.**

**During FY17 (as of May 2017), MassDEP revised its *Guidelines for Performing Infiltration/Inflow Analyses and Sewer System Evaluation Surveys*.**

**On October 6, 2017, both MassDEP and MWRA staff provided an update presentations and had discussions with the MWRA Wastewater Advisory Committee.**

**On November 29, 2017, staff from USEPA, MassDEP, and MWRA met to discuss mutual areas of interest regarding wastewater metering and I/I reduction programs.**

**On an annual basis, MWRA staff provide an update presentation to the MWRA Board of Directors on both I/I Local Financial Assistance and Local Water System Assistance Programs.**

**Periodically, MWRA staff provided update presentations to the MWRA Advisory Board and member community representatives, as well as the Wastewater Advisory Committee and Water Supply Citizens Advisory Committee, on a variety of related topics including: I/I Local Financial Assistance Program, Local Water System Assistance Program, Lead Service Line Replacement Loan Program, water and wastewater metering, water and wastewater flow data, rate assessment methodologies, water and wastewater permitting and regulations, etc. See the list of technical information noted in Strategy A, above.**

**During FY20, MWRA will continue to work cooperatively with MassDEP on this strategy.**

*Strategy D:* MWRA will develop a summary of available public education material such as local/regional billing inserts, Water Environment Federation (WEF) brochures, “How-To” pamphlets, etc. The summary will provide information on where to obtain the material. A listing of available public education materials will be posted on the MWRA Internet site. MWRA will also make copies of public education material available to communities and local associations. MWRA will pilot this strategy by distributing to member communities sample copies of the “Fat-Free Sewers” brochure developed cooperatively by the Water Environment Federation (WEF) and EPA. MWRA will recommend use of the brochures for public education. This strategy has an



ongoing schedule that will be initiated in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 8.2 Strategy B-1, and 8.2 Strategy B-4)

**Work by MWRA under this Strategy is complete as noted below.**

**MWRA distributed the Fat-Free Sewers brochure to wastewater system operators in July 2003. In conjunction with the Technical Transfer Summary package distributed on August 8, 2007 (see Strategy B, above), MWRA included a separate topic heading for “Brochures and Bill Stuffers” that can be used by local communities as educational materials. Links to educational materials are provided on [www.mwra.com](http://www.mwra.com).**

*Strategy E:* Depending on the outcome of the summary of available information being developed under Strategy D, MWRA (jointly with DEP and possibly other regional organizations) may develop informational materials that will educate the public on I/I and SSO issues. This effort may include “how-to” pamphlets that detail a step-by-step process for disconnecting private inflow sources or similar information. The development of new materials under this strategy will be targeted to fill gaps that are not covered by existing/available public education material. This strategy will be completed in the mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.2 Strategy B-2)

**Work by MWRA under this Strategy is complete as noted below.**

**As part of the Technical Transfer Summary package distributed on August 8, 2007 (see Strategy B, above), MWRA included a separate topic heading specifically for “Brochures and Bill Stuffers” that can be used by local communities as educational materials. There are sufficient example brochures available so that no additional work is needed under this strategy. Communities actively involved with private inflow removal programs have generally been using available sample brochures and other public education materials to develop public education information related to their specific project. Information already available via local engineering consultants is also utilized.**

*Strategy F:* Upon request from member communities, MWRA will assist member communities in providing a link from the local DPW or community Internet site to the MWRA Internet site. The possibility of a link or reference to other regional bodies that are involved in sewer system issues (such as DEP, EPA, New England Water Environment Association, New England Interstate Water Pollution Control Commission, watershed associations, etc.) will also be investigated. This strategy will be completed in the mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.2 Strategy B-3)

**Work by MWRA under this Strategy is complete as noted below.**

**Local communities, state agencies, regional associations, etc. all maintain their own web pages with numerous information links. MWRA’s web site contains links to the communities’ web sites and links to other organizations. Based on current broad use of the web, additional work under this strategy is not needed. MWRA continues to revise and upgraded its web site [www.mwra.com](http://www.mwra.com) and the Community Support Program page: <http://www.mwra.com/comsupport/communitysupportmain.html>.**

*Strategy G:* MWRA will integrate information on I/I and SSO issues into existing MWRA school education materials. MWRA’s School Education staff will identify what types of materials

are appropriate for their programs. This strategy has an ongoing schedule that will be initiated in the mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.3 Strategy C-1)

**Work by MWRA under this Strategy is ongoing. The focus of MWRA's School Education Program is to provide a general understanding of water and wastewater transport and treatment systems with emphasis on water conservation and environmental awareness issues. Educational materials are designed for students from elementary to high school levels.**

*Strategy H:* Upon request from DEP, MWRA will provide technical assistance to DEP to develop and issue DEP press releases prior to and during extreme wet weather events to notify the public of possible sewer system backups and overflow problems. The I/I Task Force Report recommends DEP develop a standardized format that includes a request that system users minimize non-essential water consumption activities and includes a standardized high sewer flow warning. Completion of this strategy is dependent on DEP actions. This strategy has an ongoing schedule that should be initiated in the short to mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.4 Strategy D-2)

**Work by MWRA under this Strategy is ongoing. During FY19, no assistance from MWRA was requested by MassDEP. Any future action under this strategy will be initiated jointly with MassDEP.**

*Strategy I:* Upon request from member communities, MWRA will provide technical assistance to communities to provide residents with information on I/I reduction, SSOs and backups using local cable stations or other media outlets. This strategy has an ongoing schedule that will be initiated in the mid to long-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.2 Strategy B-7)

**Work by MWRA under this Strategy is ongoing. During FY19, no assistance from MWRA was requested under this strategy.**

Goal 5 under MWRA's Regional I/I Reduction Plan is:

*MWRA will provide technical assistance and work cooperatively with member communities, DEP, and EPA regarding guidance on local operation and maintenance and capital improvement programs intended to provide a reasonable level of sewer service to local sewer users/ratepayers.*

*Strategy A:* MWRA will provide all member communities a copy of the I/I Task Force Report (which includes recommendations for sewer system operation and maintenance). MWRA will maintain a supply of I/I Task Force Reports and will provide additional copies to MWRA member communities and regional stakeholders, as requested. This strategy has an ongoing schedule that has been initiated.

**Work by MWRA under this Strategy is complete as noted below.**

**MWRA provided all member communities and all interested parties copies of the I/I Task Force Report in April 2001, shortly after the Report was completed. MWRA continues to maintain a supply of I/I Task Force Reports and provides additional copies to MWRA member communities and regional stakeholders, as requested. In July 2003, all member communities were provided a copy of the MWRA Regional I/I Reduction Plan. Both the I/I Task Force Report and MWRA Regional I/I Reduction plan are posted on MWRA's Community Support Program web page at:**

**<http://www.mwra.com/comsupport/communitysupportmain.html>**.

*Strategy B:* MWRA will request member communities provide a copy of their existing local Sewer Use Regulations to MWRA, will review those local Regulations that are submitted, and will make recommendations for improvements. MWRA may utilize a committee representing a cross-section of sewer system stakeholders to assist in accomplishing this strategy. This strategy will be completed in the mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 9.1 Strategy A-2)

**Work by MWRA under this Strategy is complete as noted below.**

**MWRA did not proceed with work under this strategy pending issuance of EPA's SSO Rule, including CMOM Regulations, that were likely to impact local sewer use regulations. EPA's draft SSO Rule was not promulgated. During FY04, MassDEP distributed a new guideline document – "Optimizing Operation, Maintenance and Rehabilitation of Sanitary Sewer Collection Systems" dated August 2003. This manual was developed by New England Interstate Water Pollution Control Commission (NEIWPCC) under a grant from EPA. The Guideline Document was written by a committee consisting of NEIWPCC member state environmental agencies, EPA, and wastewater consultants. The manual is available at [www.neiwpcc.org](http://www.neiwpcc.org). Chapter 4 of the manual "Optimizing Legal Authority" includes sections on Sewer Use Ordinances; therefore, additional work by MWRA under this strategy is not necessary. Web links to information provided by MassDEP, USEPA, and NEIWPCC are posted on MWRA's Community Support Program web page at:**

**<http://www.mwra.com/comsupport/communitysupportmain.html>**.

*Strategy C:* MWRA will develop a Member Community Collection System Operation and Maintenance Manual Guidance Document and Overflow Response Plan. This guidance document will be provided to all member communities. This strategy will be completed in the short-term.

**Work by MWRA under this Strategy is complete as noted below.**

**A Member Community Collection System Operation and Maintenance Manual Guidance Document and Overflow Response Plan was developed and submitted to EPA and MassDEP for review in June 2001. This guidance document was made available to member communities. During FY04, MassDEP distributed a new guideline document – “*Optimizing Operation, Maintenance and Rehabilitation of Sanitary Sewer Collection Systems*” dated August 2003. This manual was developed by New England Interstate Water Pollution Control Commission (NEIWPCC) under a grant from EPA. It was written by a committee consisting of NEIWPCC member state environmental agencies, EPA, and wastewater consultants. The manual is available at [www.neiwpcc.org](http://www.neiwpcc.org). MWRA provided its collection system O&M manual and the community collection system guidance document to the NEIWPCC committee for review. With the publication of the NEIWPCC manual, further efforts on the Member Community Collection System Operation and Maintenance Manual Guidance Document are not required.**

**During FY14 (as of April 25, 2014), MassDEP revised its Regulation 314 CMR 12.00 *Operation, Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers*.**

**During FY17 (as of May 2017), MassDEP revised its *Guidelines for Performing Infiltration/Inflow Analyses and Sewer System Evaluation Surveys*.**

ATTACHMENT 3  
TO  
MWRA ANNUAL I/I REDUCTION REPORT FOR FY19  
Reporting Period – July 2018 Through June 2019

## MWRA ACTIONS TAKEN TO REDUCE I/I DURING FY19

The MWRA Field Operations Department's Technical Inspection program staff have internally inspected approximately 26 miles of Authority-owned interceptors, internally inspected 32 inverted siphon barrels with sonar inspection equipment, and physically inspected 655 sewer manholes and other structures (diversion chambers, siphon headhouses, tide gates, etc.) during FY19. During the internal inspection process, problems such as physical defects, manhole frame and cover defects, infiltration/inflow, sediment, grease deposits, etc. are noted and stored in MWRA's electronic maintenance (MAXIMO) database. Maintenance work is then scheduled based on the identified problems.

During FY19, MWRA's maintenance work included hydraulic/mechanical cleaning of 36 miles of Authority-owned sewers, cleaning of 123 siphon barrels, and replacement of 109 manhole frames and covers. In addition, 67 sewer manholes were rehabilitated via cement mortar lining under MWRA's annual manhole rehabilitation contract. Potential structural problems and infiltration sources identified during the inspection process are referred to engineering staff for follow-up review and analysis of cost-effective repairs.

The MWRA is undertaking a number of significant capital projects to rehabilitate portions of Authority-owned interceptors and provide additional hydraulic capacity. Updates on these projects are included below:

1. During FY19, MWRA continued rehabilitation of sewer interceptors under the Interceptor Renewal/Asset Protection Program. Evaluation and design of interceptor rehabilitation began in FY09. The program includes a series of twelve interceptor renewal projects to be phased over multiple years at a cost of over \$150 million. Each of these projects will provide structural repairs for existing pipelines and reduce I/I entering the MWRA interceptor system. MWRA's Interceptor Renewal/Asset Protection Projects #1 through #7 for rehabilitation construction of a variety of Sewer Sections are programmed in the FY19 CIP at a cost of \$125 million. Interceptor Renewal/Asset Protection Projects #1 through #7 include:
  - Interceptor Renewal/Asset Protection Project #1: rehabilitation design and construction of 12,240 linear feet of the Reading Extension Sewer Sections 75, 74, 73, primarily in Stoneham, with short reaches in Wakefield and Woburn. Approximately 1,400 linear feet of Reading Extension Sewer Section 74 were CIPP lined in the mid 1990's. Also, included is rehabilitation of 2,280 linear feet of Metropolitan Sewer Section 46 in Stoneham, as well as, rehabilitation of 62 manholes and structures along the pipeline route. Construction began in FY17 and was completed during FY19. Total design, construction, and construction services costs were approximately \$3.1 million.

- Interceptor Renewal/Asset Protection Project #2: rehabilitation design and construction of Section 4, 5, 6 and 186 on the North Metropolitan Sewer in Winthrop and just upstream of the Deer Island Treatment Plant will include rehabilitation of about 5,300 feet of 108-inch brick sewer. Portions of this sewer were previously rehabilitated using a shotcrete process in the 1990s. A preliminary design study for this project was completed in April 2018 and the design phase is scheduled to begin in FY21. Total study, design, construction, and construction services cost estimate of \$10.3 million.
- Interceptor Renewal/Asset Protection Project #3: rehabilitation design and construction of the Dorchester Interceptor Sewer Sections 240, 241, and 242. Design for this project began in FY18 with an overall design, construction and construction services cost estimate of \$7.1 million.
- Interceptor Renewal/Asset Protection Project #4A: Rehabilitation design and construction of the Cambridge Branch Sewer Sections 27 and 26 in Charlestown, Somerville, and Cambridge. A preliminary design study for Cambridge Branch Sewer Sections 23 – 24 and 26 – 27 was completed in FY18. The design phase is scheduled to begin in FY24.
- Interceptor Renewal/Asset Protection Project #4B: Rehabilitation design and construction of the Cambridge Branch Sewer Sections 23 and 24 in Everett and Charlestown. A preliminary design study for Cambridge Branch Sewer Sections 23 – 24 and 26 – 27 was completed in FY18. The design phase is scheduled for FY26.
- Interceptor Renewal/Asset Protection Project #5: Rehabilitation design and construction of portions of Sections 607, 609, and 610 in Milton with design scheduled to begin in FY24.
- Interceptor Renewal/Asset Protection Project #6: Rehabilitation design and construction of portions of Sections 12, 14, 15, and 62 in Chelsea with design scheduled to begin in FY25.
- Interceptor Renewal/Asset Protection Project #7: Rehabilitation design and construction of portions of Sections 41, 42, 49, 54 and 65 in Melrose and Malden with design scheduled to begin in FY21.

ATTACHMENT 4  
TO  
MWRA ANNUAL I/I REDUCTION REPORT FOR FY19  
Reporting Period: July 2018 Through June 2019

**STATUS UPDATE ON MWRA's  
I/I LOCAL FINANCIAL ASSISTANCE PROGRAM**

Financial Assistance Update

All 43-member sewer communities are participating in MWRA's \$760.75 million Infiltration/Inflow (I/I) Local Financial Assistance (grant/loan) Program. The program began in May 1993 and, through FY19, \$401 million has been distributed to fund 574 local I/I reduction and sewer system rehabilitation projects. The program budget of \$760.75 million includes the most recent addition of \$300 million approved by the MWRA Board of Directors for distribution beginning in FY19, including: Phase 11 (\$100 million in grant/loan funds), Phase 12 (\$100 million in grant/loan funds), and Phase 13 (\$100 million in loan only funds). For new Phases 11 and 12, the grant component remains as 75% of the eligible project costs. The table on page 2 provides a summary of funding allocations, distributions, and funds remaining for each MWRA sewer community. Distribution of grant and loan financial assistance to member communities has been approved through FY30. The table on page 3 provides a summary of funding distributions by fiscal quarter since Program inception.

Program Background

MWRA's I/I Local Financial Assistance Program was initiated to provide funding to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned collection systems. Following recommendations from the MWRA Advisory Board, the MWRA Board of Directors has approved a total program budget of \$760.75 million. The funds have been allocated among the 43 MWRA sewer communities based on respective share of MWRA's wholesale sewer charge. Financial assistance for Phases 1 and 2 (total of \$63.75 million) was distributed for approved projects as a 25 percent grant and a 75 percent interest-free loan. The grant/loan split was revised for distribution of the Phase 3 through 8 funds (total of \$237 million) to a 45 percent grant and a 55 percent interest-free loan. The interest-free loan portion for Program Phases 1 through 8 has been repaid to MWRA over a five-year period beginning one year after the date the funds are distributed. The grant/loan split was again enhanced for distribution of Phases 9 through 12 funds (total of \$360 million) to a 75 percent grant and a 25 percent interest-free loan. The interest-free loan repayment period for Program Phases 9 through 12 has been extended to ten years from the previous five (again beginning one year after the date the funds are distributed). Phase 13 is a \$100 million loan-only Phase also with a ten-year repayment.

MWRA funding is provided to a community following execution of a standard agreement that stipulates the project scope, schedule, and loan repayment requirements. Communities are required to provide periodic schedule and expenditure progress reports to MWRA. For planning and design projects, the work products (reports, plans, specifications, and bidding documents) are reviewed and approved by MWRA. During construction, MWRA staff perform site visits to document progress.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM  
FUNDING SUMMARY AS OF JULY 2019**

Community	Total Allocations (Phases 1 - 13)	Total Distributions (Phases 1 - 13)	Percent Distributed	Funds Remaining
Arlington	\$13,703,000	\$9,223,000	67%	\$4,480,000
Ashland	\$3,818,500	\$1,742,450	46%	\$2,076,050
Bedford	\$5,654,600	\$2,439,658	43%	\$3,214,942
Belmont	\$8,255,100	\$2,992,100	36%	\$5,263,000
Boston	\$218,001,200	\$94,112,776	43%	\$123,888,424
Braintree	\$14,419,000	\$8,359,000	58%	\$6,060,000
Brookline	\$21,355,200	\$7,666,200	36%	\$13,689,000
Burlington	\$8,432,800	\$6,212,800	74%	\$2,220,000
Cambridge	\$39,250,100	\$28,830,100	73%	\$10,420,000
Canton	\$6,635,900	\$2,675,900	40%	\$3,960,000
Chelsea	\$11,760,100	\$5,551,100	47%	\$6,209,000
Dedham	\$9,220,000	\$5,740,000	62%	\$3,480,000
Everett	\$13,381,500	\$6,650,500	50%	\$6,731,000
Framingham	\$20,375,000	\$10,075,000	49%	\$10,300,000
Hingham	\$2,802,500	\$2,022,500	72%	\$780,000
Holbrook	\$2,779,600	\$896,562	32%	\$1,883,038
Lexington	\$12,125,300	\$9,005,300	74%	\$3,120,000
Malden	\$20,683,900	\$5,641,900	27%	\$15,042,000
Medford	\$19,637,600	\$7,961,600	41%	\$11,676,000
Melrose	\$10,126,300	\$7,157,300	71%	\$2,969,000
Milton	\$9,014,500	\$5,564,500	62%	\$3,450,000
Natick	\$9,332,600	\$5,582,600	60%	\$3,750,000
Needham	\$9,977,600	\$3,218,600	32%	\$6,759,000
Newton	\$34,937,400	\$25,777,400	74%	\$9,160,000
Norwood	\$11,589,400	\$6,879,400	59%	\$4,710,000
Quincy	\$32,780,000	\$23,302,039	71%	\$9,477,961
Randolph	\$10,070,800	\$3,894,800	39%	\$6,176,000
Reading	\$7,749,100	\$5,669,100	73%	\$2,080,000
Revere	\$16,940,900	\$5,502,900	32%	\$11,438,000
Somerville	\$25,955,800	\$12,116,900	47%	\$13,838,900
Stoneham	\$7,829,900	\$5,889,900	75%	\$1,940,000
Stoughton	\$7,902,900	\$5,252,900	66%	\$2,650,000
Wakefield	\$9,806,900	\$6,493,310	66%	\$3,313,590
Walpole	\$6,110,000	\$3,042,000	50%	\$3,068,000
Waltham	\$22,282,400	\$15,226,900	68%	\$7,055,500
Watertown	\$10,155,800	\$5,235,800	52%	\$4,920,000
Wellesley	\$9,249,700	\$3,582,504	39%	\$5,667,196
Westwood	\$4,302,300	\$2,091,300	49%	\$2,211,000
Weymouth	\$19,100,900	\$9,425,900	49%	\$9,675,000
Wilmington	\$4,232,000	\$2,034,000	48%	\$2,198,000
Winchester	\$6,793,000	\$4,183,000	62%	\$2,610,000
Winthrop	\$5,553,400	\$3,066,900	55%	\$2,486,500
Woburn	\$16,665,500	\$12,685,500	76%	\$3,980,000
Totals	\$760,750,000	\$400,673,899	53%	\$360,076,101



MWRA I/I Local Financial Assistance Program - Fiscal Year Breakdown

FY	Distribution Cycle	Distribution Amount	Distribution Cycle	Distribution Amount	Distribution Cycle	Distribution Amount	Distribution Cycle	Distribution Amount	FY Total
FY93	Aug 1992	\$0	Nov 1992	\$0	Feb 1993	\$0	May 1993	\$2,714,883	\$2,714,883
FY94	Aug 1993	\$3,096,468	Nov 1993	\$4,096,133	Feb 1994	\$3,191,032	May 1994	\$251,494	\$10,635,127
FY95	Aug 1994	\$354,126	Nov 1994	\$976,700	Feb 1995	\$1,894,030	May 1995	\$6,489,891	\$9,714,747
FY96	Aug 1995	\$0	Nov 1995	\$504,100	Feb 1996	\$2,921,600	May 1996	\$3,902,426	\$7,328,126
FY97	Aug 1996	\$1,682,061	Nov 1996	\$1,581,266	Feb 1997	\$395,100	May 1997	\$3,530,758	\$7,189,185
FY98	Aug 1997	\$1,066,300	Nov 1997	\$1,157,260	Feb 1998	\$909,350	May 1998	\$2,001,608	\$5,134,518
FY99	Aug 1998	\$1,521,100	Nov 1998	\$2,464,263	Feb 1999	\$1,481,700	May 1999	\$5,758,077	\$11,225,140
FY00	Aug 1999	\$1,315,767	Nov 1999	\$1,847,900	Feb 2000	\$1,679,000	May 2000	\$1,070,100	\$5,912,767
FY01	Aug 2000	\$1,148,400	Nov 2000	\$388,000	Feb 2001	\$1,640,931	May 2001	\$804,800	\$3,982,131
FY02	Aug 2001	\$4,480,735	Nov 2001	\$704,040	Feb 2002	\$1,804,200	May 2002	\$5,002,691	\$11,991,666
FY03	Aug 2002	\$1,962,600	Nov 2002	\$4,461,768	Feb 2003	\$7,955,752	May 2003	\$1,836,600	\$16,216,720
FY04	Aug 2003	\$2,021,940	Nov 2003	\$1,306,200	Feb 2004	\$1,770,760	May 2004	\$3,295,400	\$8,394,300
FY05	Aug 2004	\$2,756,659	Nov 2004	\$6,013,436	Feb 2005	\$4,054,060	May 2005	\$2,636,700	\$15,460,855
FY06	Aug 2005	\$5,377,487	Nov 2005	\$4,589,600	Feb 2006	\$1,519,463	May 2006	\$6,489,676	\$17,976,226
FY07	Aug 2006	\$0	Nov 2006	\$4,947,414	Feb 2007	\$8,789,300	May 2007	\$8,121,023	\$21,857,737
FY08	Aug 2007	\$3,915,500	Nov 2007	\$4,355,750	Feb 2008	\$1,392,400	May 2008	\$4,436,600	\$14,100,250
FY09	Aug 2008	\$4,196,399	Nov 2008	\$352,000	Feb 2009	\$1,990,300	May 2009	\$4,872,400	\$11,411,099
FY10	Aug 2009	\$5,462,736	Nov 2009	\$616,600	Feb 2010	\$2,679,600	May 2010	\$4,845,000	\$13,603,936
FY11	Aug 2010	\$723,700	Nov 2010	\$3,183,250	Feb 2011	\$4,123,100	May 2011	\$4,258,900	\$12,288,950
FY12	Aug 2011	\$3,695,100	Nov 2011	\$2,417,378	Feb 2012	\$848,300	May 2012	\$7,010,324	\$13,971,102
FY13	Aug 2012	\$21,299,965	Nov 2012	\$1,004,610	Feb 2013	\$2,460,000	May 2013	\$2,675,000	\$27,439,575
FY14	Aug 2013	\$7,550,310	Nov 2013	\$0	Feb 2014	\$2,929,700	May 2014	\$2,271,852	\$12,751,862
FY15	Aug 2014	\$4,053,000	Nov 2014	\$7,647,400	Feb 2015	\$10,128,648	May 2015	\$4,803,450	\$26,632,498
FY16	Aug 2015	\$3,983,100	Nov 2015	\$5,783,000	Feb 2016	\$7,195,116	May 2016	\$5,483,000	\$22,444,216
FY17	Aug 2016	\$2,352,100	Nov 2016	\$6,553,210	Feb 2017	\$2,918,900	May 2017	\$10,434,030	\$22,258,240
FY18	Aug 2017	\$8,085,900	Nov 2017	\$10,311,545	Feb 2018	\$1,377,800	May 2018	\$1,909,730	\$21,684,975
FY19	Aug 2018	\$4,107,370	Nov 2018	\$12,150,449	Feb 2019	\$19,027,200	May 2019	\$11,067,748	\$46,352,767
Total		\$96,208,823		\$89,413,272		\$97,077,342		\$117,974,461	\$400,673,899

## Program Goals

The I/I Local Financial Assistance Program is a critical component of MWRA's Regional I/I Reduction Plan. Specifically, local sewer system rehabilitation projects are intended to at least offset ongoing collection system deterioration to prevent a net increase in regional I/I. In the long-term, system rehabilitation should result in lower I/I, which will allow for future increases in sanitary (residential, commercial, industrial, and institutional) flow without a net increase in total wastewater flow to the Deer Island Treatment Plant.

A second goal of the program is to assist member communities in implementing effective annual local collection system maintenance programs to assure efficient operation and ongoing collection system repair/replacement.

## Type of Local Projects Receiving Funding

Funding has been provided to local communities for eligible I/I reduction projects including planning, design, construction, and engineering services during construction. These projects generally take one to three years to complete. Seventy-nine percent of funds distributed to date have financed local construction projects. The table below details funds distributed by project phase for both completed and ongoing projects.

PROJECT PHASE	COMPLETE PROJECTS (\$ millions)	ONGOING PROJECTS (\$ millions)	TOTAL (\$ millions)
Planning/Study:	\$ 44.2	\$ 5.4	\$ 49.6 (12%)
Design:	14.1	1.9	16.0 (4%)
Construction:	239.5	75.0	314.5 (79%)
Eng. Services During Const.:	16.7	3.9	20.6 (5%)
TOTAL	\$ 314.5 (78%)	\$ 86.2 (22%)	\$ 400.7 (100%)

## Program Results

The I/I Local Financial Assistance Program began in May 1993. Through FY19, a total of 574 local I/I reduction and sewer system rehabilitation projects have been funded through the MWRA's grant/loan program. Cumulative results for the program are summarized below.

Results for all projects (FY93 through FY19) for planning/inspection include the following:

- 2,076 miles of sewer TV inspected
- 1,452 miles of sewer flow isolated
- 1,331 miles of sewer smoke tested
- 58,669 sewer manholes inspected
- 77,894 buildings inspected

Results for all projects (FY93 through FY19) targeting infiltration reduction include the following:

- 72 miles sewer replaced
- 225 miles sewer CIPP lined
- 172 miles sewer tested/chemically sealed
- 2,562 sewer spot repairs
- 13,678 service connection repairs
- 4.8 miles underdrains sealed

Results for all projects (FY93 through FY19) targeting inflow reduction include the following:

- 1,060 catch basins disconnected

- 44 miles of new or replaced storm drains
- 19,755 manholes rehabilitated/sealed
- 3,404 manhole covers replaced or inflow seals installed
- 433 sump pumps redirected
- 5,292 downspouts/area drains disconnected

### Stormwater and Infiltration/Inflow Impacts to the Collection System

Wastewater discharged by member sewer communities to MWRA is influenced by seasonal and wet-weather conditions related to stormwater in combined sewer systems, groundwater infiltration, and stormwater and tidal inflow. Infiltration/Inflow (I/I) is extraneous water that enters all wastewater collection systems through a variety of sources.

Infiltration is groundwater that enters the collection system through physical defects such as cracked pipes/manholes or deteriorated joints. Typically, many sewer pipes and sewer service laterals are below the surrounding groundwater table. Therefore, leakage into the sewer (infiltration) is a broad problem that is difficult and expensive to identify and reduce.

Inflow is extraneous flow entering the collection system through point sources and may be directly related to storm water run-off from sources such as roof leaders, yard and area drains, basement sump pumps, ponded manhole covers, cross connections from storm drains or catch basins, leaking tide gates, etc. Inflow causes a rapid increase in wastewater flow that occurs during and continuing after storms and extreme high tides. The volume of inflow entering a collection system typically depends on the magnitude and duration of rainfall, as well as related impacts from snowmelt, flooding, and storm surge.

Stormwater in Combined Sewers is, by design, collected in the combined sewer system to be transported to a downstream treatment facility. Additional system capacity is available via combined sewer overflow (CSO) storage facilities and outfalls that may be active during rainfall events.



### Regional Wastewater Flow Trends

Wastewater Flow Graph 1 (page 7) provides long-term regional flow data for the Deer Island Treatment Plant collection system and annual rainfall. The long-term average daily flow for the total system is about 353 mgd (last 30 years from 1989-2018) and the average annual rainfall is 43 inches (Boston Logan Airport Data). Wastewater Flow Graph 2 (page 8) shows the five-year running averages (flow and rainfall) as a means of smoothing the annual variability in the long-term data displayed in Wastewater Flow Graph 1. The five-year running average daily flow has declined from approximately 391 mgd to approximately 311 mgd, a reduction of 80 mgd or 20% of wastewater flow tributary to the Deer Island Treatment Plant.

During dry summer months, total system minimum flows drop to as low as 220 mgd. Few problems exist within local and regional sewer systems during dry weather or as a result of small and medium storm events. In contrast, peak wet-weather flow during occasional significant rainfall exceeds the 1,270 mgd plant capacity, more than 3.5 times the average flow. The collection system has

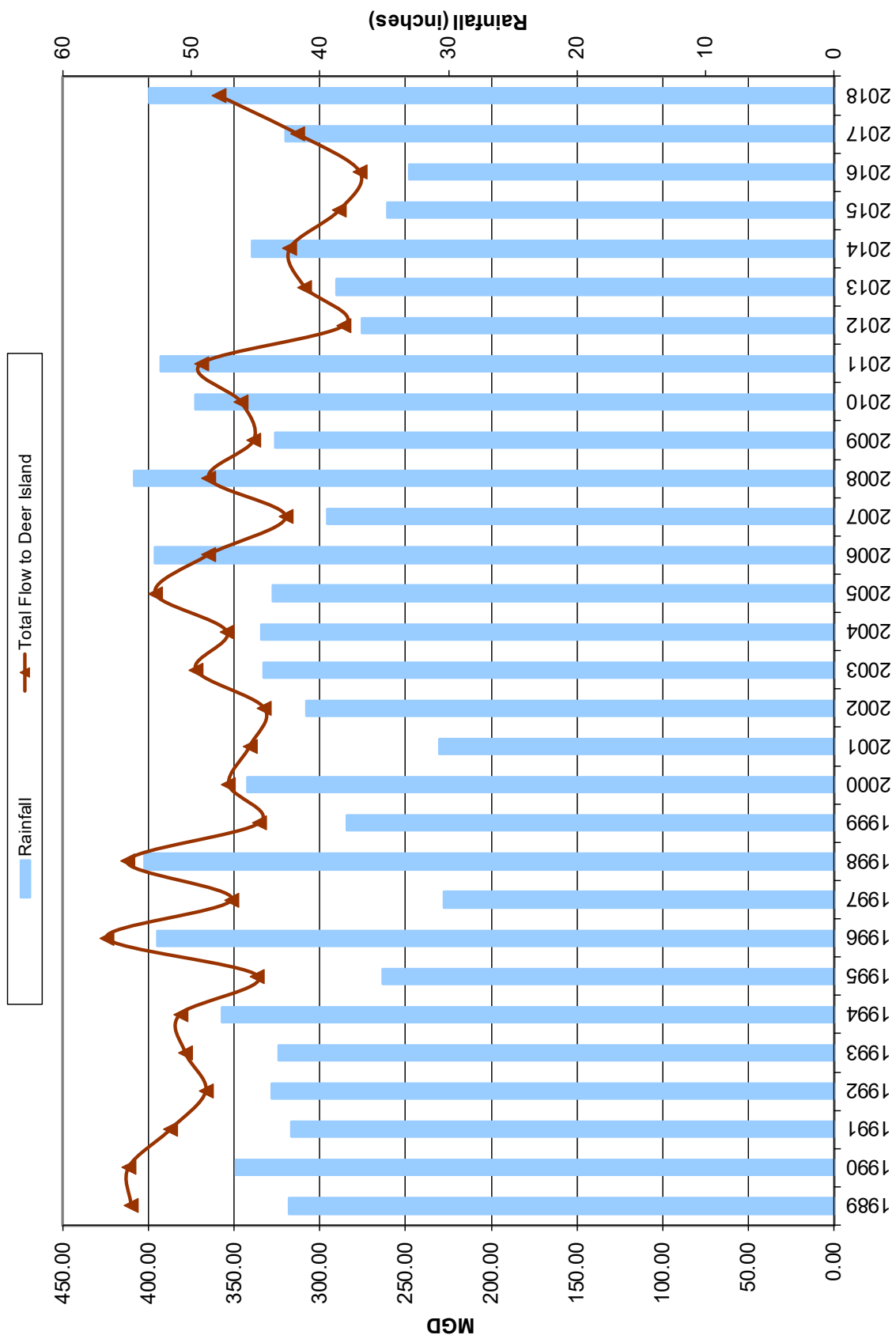
additional capacity available at combined sewer overflow (CSO) storage facilities and outfalls. Extreme storm events that occur during periods of high groundwater, may cause sewer system surcharging and sanitary sewer overflows (SSOs).

Over the last five years (2014-2018), MWRA's average daily flow of 311 mgd has been about 12% below the long-term average of 353 mgd. The five-year average rainfall of 42 inches has only been about 2% below the long-term average of 43 inches.

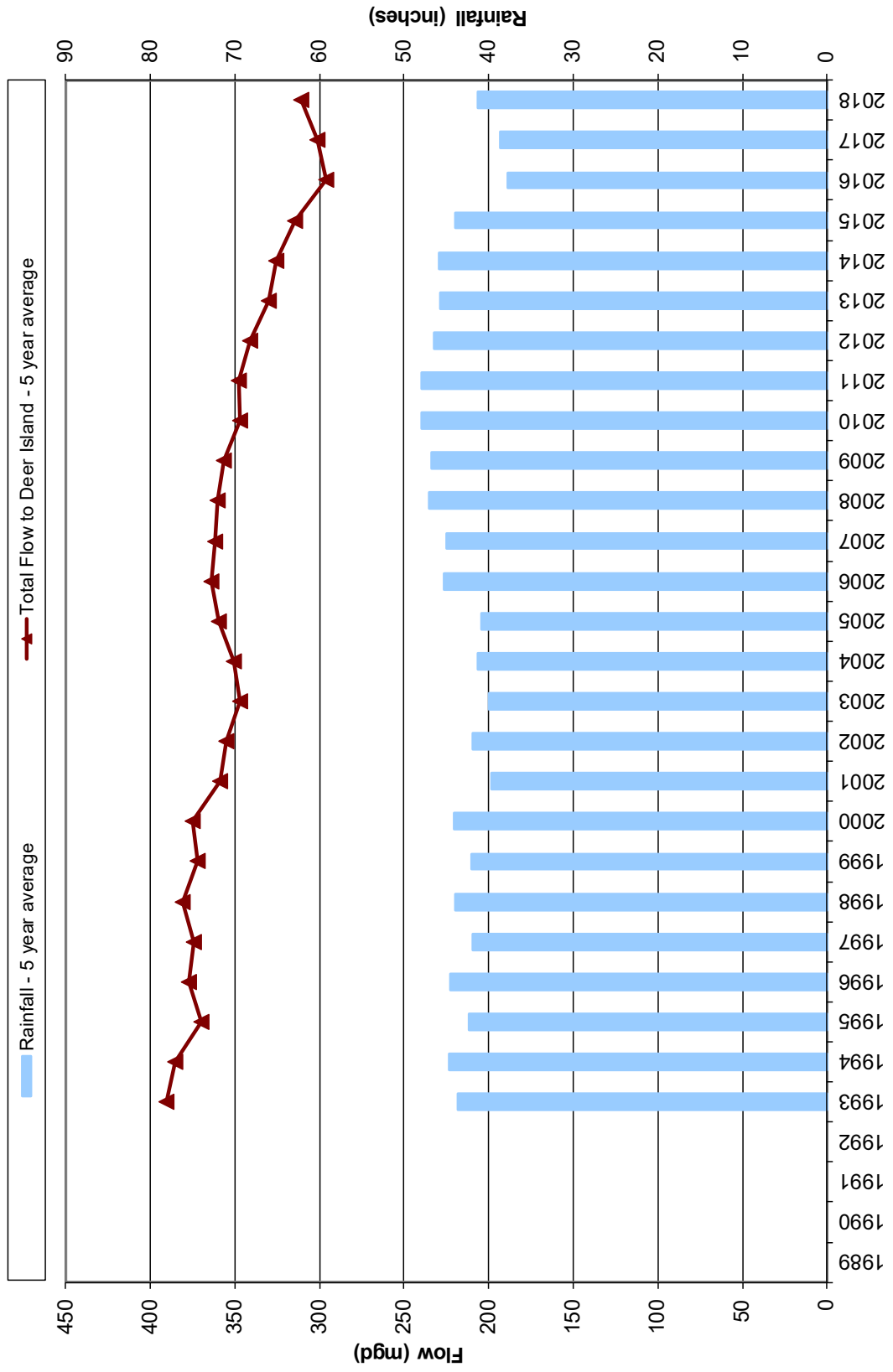
The estimated average daily flow reduction associated with completed local I/I reduction projects that have received MWRA financial assistance is about 95 million gallons per day (mgd). This flow reduction "ballpark" figure is based on the communities' (or their consultants') peak I/I reduction estimates, which have been prorated by MWRA staff to estimate an annual average I/I reduction. The estimated I/I reduction represents groundwater and stormwater that no longer enter the collection system at the point of sewer repair. Regional wastewater flow trends are influenced by many factors, including:

- MWRA's financial assistance for local I/I reduction and sewer rehabilitation projects provide gradual improvements to the regional collection system reducing I/I and stormwater. However, each year the regional collection system gets older and continues to deteriorate, which increases I/I.
- Sewer capacity gained by elimination of I/I in one subsystem may allow additional I/I to enter the collection system at a different location (known as infiltration migration), resulting in less net flow reduction at the end of the collection system;
- CSO separation projects reduce stormwater tributary to the combined sewer system leading to decreased flows. However, MWRA's pumping and interceptor relief upgrades, as well as CSO optimization projects, are intended to maximize sewer flow to the treatment plant leading to increased flows.
- Wastewater flows within the collection system vary dramatically due to changes in precipitation. For example, annual average daily flow for MWRA's system varies up to 100 mgd from year to year (from a low of less than 300 mgd to a high of more than 400 mgd). Small flow reductions for individual projects are dwarfed by regional flow fluctuations; and,
- In the MWRA service area over the last 20 years, the decline in per capita indoor water use could account for about 20 mgd in wastewater flow reduction after the increase in wastewater flow from increased sewer population is accounted for.

**Wastewater Flow Graph 1**  
**MWRA Long-Term Regional Flow Data**  
**NOAA Annual Rainfall at Logan Airport**



**Wastewater Flow Graph 2**  
**MWRA Long-Term Regional Flow Data**  
**5-year Running Averages**  
**5 year running NOAA Rainfall Average at Logan Airport**



### Community Projects Funded During FY19

During FY19, MWRA distributed a total of \$46.4 million in grants and loans to member communities to help fund 29 local I/I reduction projects. Community projects are funded quarterly under the MWRA I/I Local Financial Assistance Program. Attached (following this page) are funding summaries for the four quarterly funding distributions during FY19:

- First Quarter FY19 - August 2018 Funding Cycle with \$4,107,370 distributed to four communities: Boston, Milton, Natick and Weymouth;
- Second Quarter FY19 - November 2018 Funding Cycle with \$12,150,449 distributed to seven communities: Hingham, Lexington, Malden, Newton, Quincy, Stoughton, and Wakefield;
- Third Quarter FY19 - February 2019 Funding Cycle with \$19,027,200 distributed to eight communities: Braintree, Cambridge, Framingham, Melrose, Stoneham, Watertown, Winthrop, and Woburn; and,
- Fourth Quarter FY19 - May 2019 Funding Cycle with \$11,067,748 distributed to nine communities: Arlington, Bedford, Burlington, Framingham, Reading, Somerville, Stoughton, Waltham, and Wilmington.

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# MWRA I/I Local Financial Assistance Program Funding Summary

August 2018 Funding Cycle

<u>Community</u>	<u>Funding Allocation</u>
Boston	\$ 1,434,370
Milton	\$ 914,000
Natick	\$ 969,000
Weymouth	\$ 790,000
Total	\$ 4,107,370

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM  
ATTACHMENT A  
MWRA PROJECT NO. WRA-P9-05-3-988**

**BWSC SEWERAGE, WATER AND DRAINAGE WORKS IMPROVEMENTS**

**EAST BOSTON SEWER SEPARATION – PHASE 1**

**BWSC CONTRACT NO. 16-309-005**

**SCOPE OF SERVICES**

This project will separate sewer flows within East Boston. The project work area includes the following streets: Brooks Street / Eutaw Street / Meridian Street / Monmouth Street / Trenton Street / White Street. The separation of sewers and drains (and installation of a new tidegate/check valve) will result in a decrease of combined sewer overflows that currently discharge to the Mystic and Chelsea Rivers (BOS 012 / 13). Separation of this area was not included in the MWRA's CSO Plan.

Work to be performed under this project includes, but is not necessarily limited to, contracted installation of approximately 3450 linear feet (LF) of 8 to 27-inch storm drains; structurally lining 2130 LF of 16-inch x 24-inch and 24-inch x 27-inch sewer pipe; installation of 37 manholes; disconnecting 60 downspouts; rehabilitating five (5) manholes; cleaning and TV inspecting 6500 LF of sewer pipe; and the performance of all other work pursuant to the terms and conditions detailed within the plans and specifications of BWSC Contract No. 16-309-005 [Sewerage, Water and Drainage Works Improvements in East Boston (East Boston Sewer Separation - Phase 1)] and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received July 17, 2018.

The area being separated by this project is approximately 42 acres. The peak and average annual inflow reductions are estimated to be 19 mgd and 0.11 mgd, respectively. Total project cost is estimated at \$4,767,109. Eligible MWRA I/I Local Financial Assistance is \$1,434,370 (Separation Construction = \$1,434,370).

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Construction	June 2018	November 2019

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF MILTON, MASSACHUSETTS  
YEAR 13 INFILTRATION REHABILITATION - DESIGN / CONSTRUCTION  
YEAR 14 I/I INVESTIGATION AND REPORTING - STUDY  
MWRA PROJECT NO. WRA-P9-21-3-987**

**SCOPE OF SERVICES**

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. The project area includes Milton Subareas DI-02 / G-03A / G-03C / G-04 / G-06 / G-07 / G-08D / G-09 / G-10A / G-10B / G-11B / G-11D / G-11E / PS-02 / PS-03 / S-01 / S-01A / S-07B / S-07D / S-08 / S-17A / S-18. Project work will include, but not be limited to, the following:

1. **Year 13 Infiltration Rehabilitation Design:** Design cost-effective and value-effective sewer rehabilitations in Subareas DI-02 / G-03A / G-03C / G-08D / G-09 / G-10A / G-10B / G-11D / S-01 / S-01A / S-07B / S-07D / S-08; prepare construction rehabilitation drawings and specifications for public bidding; and prepare a final cost estimate for the designed rehabilitations. (Eligible Design Services Cost = \$60,000)
2. **Year 13 Infiltration Rehabilitation Construction (Milton Contract No. S18-1):** Construction of cost-effective and value-effective sewer rehabilitations in Subareas DI-02 / G-03A / G-03C / G-08D / G-09 / G-10A / G-10B / G-11D / S-01 / S-01A / S-07B / S-07D / S-08 and the performance of construction public bid/award/resident project representative services. Sewer rehabilitation work (Base Bid + Alternate Bid No. 1) includes approximately: 15,300 LF of cleaning and television inspection; 9725 LF of testing and sealing of joints; installing 8600 LF of CIP pipe; installing 209 LF of CIP short liners; performing three open cut point repairs; cutting three protruding service connections; testing and grouting 161 service connections; rehabilitating 34 manholes; topside inspection of 43 sewer manholes; and performing 20,425 LF of post-construction flow isolation. (Eligible Construction Cost = \$572,710 / Eligible Construction Services Cost = \$100,000)
3. **Year 14 I/I Investigation and Reporting:** Clean, TV inspect, videotape and record 47,600 LF of sewer; conduct flow isolation on 45,500 LF of sewer; and perform topside manhole inspections of 270 sewer manholes in Subareas G-04 / G-06 / G-07 / G-11B / G-11E / PS-02 / PS-03 / S-17A / S-18. (Eligible Investigation Services Cost = \$181,290)

The above work will be performed pursuant to the terms and conditions detailed within the March 22, 2018 Agreement(s) For Engineering Services By and Between the Town of Milton and Weston & Sampson Engineers, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received July 12, 2018. Total project cost is estimated at \$914,000 (Design = \$60,000 / Construction = \$572,710 / Construction Services = \$100,000 / Investigation Services = \$181,290). Eligible MWRA I/I Local Financial Assistance is \$914,000. As a result of the above work, an estimated 0.06 mgd of peak I/I will be removed from the collection system.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF MILTON, MASSACHUSETTS  
YEAR 13 INFILTRATION REHABILITATION - DESIGN / CONSTRUCTION  
YEAR 14 I/I INVESTIGATION AND REPORTING - STUDY  
MWRA PROJECT NO. WRA-P9-21-3-987**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
<u>Year 13 Infiltration Rehabilitation</u>		
Design	February 2018	March 2018
Design Review	April 2018	May 2018
Advertise	May 2018	May 2018
Bid Opening	June 2018	June 2018
Contract Award	July 2018	July 2018
Rehabilitation Construction	August 2018	October 2018
Warranty Retesting	March 2019	April 2019
<u>Year 14 I/I Investigation and Reporting</u>		
Investigation	March 2018	June 2018
Data Review/Report Preparation	July 2018	October 2018

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF NATICK, MASSACHUSETTS  
I/I REHABILITATION (BASINS 6 / 11 / 14 / 16)**

**MWRA PROJECT NO. WRA-P9-22-3-990**

**SCOPE OF SERVICES**

Project rehabilitation work will be performed in Natick Basins 6 / 11 / 14 / 16 and will include, but not be limited to, the following:

1. CIPP lining / joint testing and sealing / service lateral testing and sealing / service lateral CIPP lining of approximately 18,000 LF of sewer main; and
2. Chemical grouting / interior lining / frame and cover replacement of approximately 140 sewer manholes.

The above work will be performed pursuant to the terms and conditions detailed within the Agreement For Professional Services By and Between the Town of Natick and Haley and Ward, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received July 27, 2018.

Total project cost is estimated at \$1,923,500. Eligible MWRA I/I Local Financial Assistance is \$969,000.

As a result of the above sewer rehabilitation work, an estimated 0.14 mgd of peak infiltration will be removed from the collection system upon contract completion.

**PROJECT SCHEDULE**

<u>Task</u>	<u>Start Date</u>	<u>Completion Date</u>
Design	July 2018	September 2018
Public Bidding	October 2018	October 2018
Rehabilitation Construction	December 2018	June 2022

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF WEYMOUTH, MASSACHUSETTS  
2018 SEWER SYSTEM INFILTRATION REHABILITATION  
MWRA PROJECT NO. WRA-P9-39-3-989**

**SCOPE OF SERVICES**

The purpose of this project is to rehabilitate community sewer subareas (Subareas A-1 / C-8) that contribute excessive I/I.

Rehabilitation work will include, but not be limited to, the following: 4465 LF of cleaning and TV inspection; 11,823 LF of cleaning, inspecting, testing and sealing; chemical root treatment of 6344 LF of sewer main and six (6) manholes; installing 4329 LF of CIP pipe and 66 LF of CIP short liners; testing and grouting 33 service connections; CIP lining of six (6) laterals; cementitious lining of 75 manholes (598 VF); furnishing and installing ten (10) manhole inflow dishes; and performing two (2) open cut repairs on gravity sewers (Wessagusett Road / Sandra Lane).

Total rehabilitation project cost is estimated at \$790,000. Eligible MWRA I/I Local Financial Assistance is \$790,000. Project work will be performed pursuant to the terms and conditions detailed within the approved MWRA Phase 9 I/I Local Financial Assistance Project Application (received July 26, 2018) and the Town of Weymouth Sewer System Infiltration Rehabilitation Contract Documents. As a result of the above work, an estimated 0.10 mgd of peak infiltration will be removed from the collection system upon contract completion.

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Bid & Award	August 2018	August 2018
Construction w/Warranty Retesting	September 2018	June 2019

## MWRA I/I Local Financial Assistance Program Funding Summary

November 2018 Funding Cycle

<u>Community</u>	<u>Funding Allocation</u>
Hingham	\$ 390,000
Lexington	\$ 1,560,000
Malden	\$ 1,048,000
Newton	\$ 4,580,000
Quincy	\$ 3,646,039
Stoughton	\$ 400,000
Wakefield	\$ 526,410
Total	\$ 12,150,449

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT  
TOWN OF HINGHAM, MASSACHUSETTS  
FY17 I/I INVESTIGATION & REHABILITATION PROGRAM  
MWRA PROJECT NO. WRA-P9-15-3-994**

**SCOPE OF SERVICES**

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. The project work area includes Hingham Sewer Subareas 1 through 8. Project work will include, but not be limited to, the following:

ON-CALL WASTEWATER SERVICES CONTRACT FY17-S2 (WORK ORDER 1.1) - YEAR 2 ANNUAL SEWER PROGRAM: Contract 1 - Sewer Cleaning and Inspection including TV inspection of approximately 41,400 LF of sewers. (Estimated Cost = \$62,000)

ON-CALL WASTEWATER SERVICES CONTRACT FY17-S2 (WORK ORDER 2.1) - YEAR 1 (FY17) ANNUAL SEWER PROGRAM CONSTRUCTION: Contract 2 - Trenchless Sewer Repairs including 2971 LF of sewer testing and sealing; installing 1786 LF of structural CIP pipe; installing short liners at five (5) locations; installing CIP lateral liners at five (5) locations; performing ten (10) manhole rehabilitations; and furnishing/installing nineteen (19) manhole inflow dishes. (Estimated Cost = \$140,000)

ON-CALL WASTEWATER SERVICES CONTRACT FY17-S2 (WORK ORDERS 3.1 / 3.2) - YEAR 1 (FY17) ANNUAL SEWER PROGRAM CONSTRUCTION: Contract 3 - Sewer Dig Repairs including performing five (5) open cut point repairs. (Estimated Cost = \$61,900)

YEAR 1 (FY17) SEWER REHABILITATIONS CONSTRUCTION SERVICES: Part-time construction services for the On-Call Wastewater Services - Year 1 (FY17) Annual Sewer Program Construction. (Estimated Cost = \$40,000)

YEAR 2 ANNUAL SEWER PROGRAM - INFILTRATION AND INFLOW SERVICES: Review TV inspection videos of as many as 35,000 LF of sewer; topside manhole inspections of as many as 240 sanitary sewer manholes; perform a GIS mapping update; populate database with inspection information; submit a detailed letter report that describes the areas in which work was performed, summarize the work completed to date and include recommendations, a cost-effectiveness analysis, and a prioritization analysis for rehabilitation of those pipeline/manhole defects and sources of infiltration and inflow that have been identified during the investigation. (Estimated Cost = \$48,000)

ON-CALL SEWER SERVICES CONTRACT 3: Broad Cove Force Main Spot Repair / Lincoln Street and Thaxter Street Manhole Frame and Cover Replacement. (Estimated Cost = \$38,100)

Project work will be performed pursuant to the terms and conditions detailed within the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received October 23, 2018 and the Agreements For Engineering Services By And Between The Town of Hingham, MA And Weston & Sampson Engineers. Peak I/I reduction is estimated to be 0.07 mgd. Total project cost is estimated at \$390,000. Eligible MWRA I/I Local Financial Assistance is \$390,000 (Phase 11 Funding Allocation Limit).



**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT  
TOWN OF HINGHAM, MASSACHUSETTS  
FY17 I/I INVESTIGATION & REHABILITATION PROGRAM  
MWRA PROJECT NO. WRA-P9-15-3-994**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
<u>On-Call Wastewater Services</u>		
Year 1 (FY17) Annual Sewer Program Construction	Fall 2018	Winter 2019
Year 1 (FY17) Annual Sewer Program Construction Retest	Spring 2019	Spring 2019
<u>Year 2 Annual Sewer Program</u>		
Manhole Inspections	Spring 2018	Spring 2018
TV Inspections (On-Call Services Contract 1)	Spring 2018	Spring 2018
TV Inspections Review	Summer 2018	Summer 2018
Engineering Review / Reporting / Updating Database	Fall 2018	Winter 2019

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF LEXINGTON, MASSACHUSETTS**

**PHASE 6 SEWER SYSTEM IMPROVEMENTS – CONSTRUCTION**

**MWRA PROJECT NO. WRA-P9-17-3-993**

**SCOPE OF SERVICES**

The purpose of this project is to rehabilitate community sewer basins that contribute excessive I/I to the sanitary sewer system. The project area includes Lexington Sewer Basins 2 / 4 / 8 / 12. Project work will include, but not be limited to, the following:

1. Replace 235 LF of 8-inch diameter sewer main;
2. Install CIPP liners in 10,380 LF of 8 to 12-inch diameter sewer main;
3. Install structural CIPP liners in 5840 LF of 8 to 10-inch diameter sewer main;
4. Install CIP short liners in 185 LF of 8 to 10-inch diameter sewer main;
5. Install structural CIP short liners in 33 LF of 8 to 10-inch diameter sewer main;
6. Perform two (2) open cut point repairs;
7. Perform 5680 LF of heavy cleaning and inspection;
8. Perform 15,875 LF of cleaning, inspection, testing and sealing; and
9. Perform 1865 VF of cementitious manhole lining.

The above work will be performed pursuant to the terms and conditions detailed within the Agreement For Engineering Services By and Between the Town of Lexington and Weston & Sampson Engineers, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received October 25, 2018. Total project cost is estimated at \$2,090,000 (Construction = \$2,090,000). Eligible MWRA I/I Local Financial Assistance is \$1,560,000 (Phase 11 Allocation Limit). As a result of the above work, an estimated 0.23 mgd of peak infiltration will be removed from the collection system.

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Bid Opening/Contract Award	December 2018	December 2018
Rehabilitation Construction	January 2019	May 2019
Warranty Retesting	March 2020	May 2020

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF MALDEN, MASSACHUSETTS  
SANITARY SEWER EVALUATION SURVEY  
WASTEWATER FLOW MONITORING PROGRAM  
SEWER IMPROVEMENTS (MALDEN CONTRACT 2019-S-1)  
MWRA PROJECT NO. WRA-P9-18-3-996**

**SCOPE OF SERVICES**

The scope of work for these projects has three main components: (1) perform field investigations to further the City efforts in understanding the physical condition its wastewater infrastructure; (2) design and construct sewer main/manhole rehabilitations with known I/I contributions or suspected water quality impacts; and (3) establish I/I program management elements to assist the City in efficiently and effectively managing its I/I reduction program.

**Sanitary Sewer Evaluation Survey (SSES):** Project work will focus on the southeast (low elevation) area of the City. SSES work includes: (1) Smoke testing sewer mains to identify segments of pipe with direct/indirect inflow sources. Smoke testing will be conducted during periods of low groundwater and after sufficient time has elapsed from previous rainfall events; (2) Flow isolating sewer mains to quantify infiltration amounts within manhole-to-manhole segments. The flow isolation inspection will be conducted between the hours of 12AM and 6AM when groundwater levels are typically at their highest and sanitary flows are at a minimum; (3) Cleaning, CCTV inspecting, videotaping and recording sewer main segments. The CCTV inspections will be performed to locate problem areas and I/I sources within manhole-to-manhole segments of the sewer main; (4) Conducting topside physical survey of sewer manholes for defects and I/I sources. A written log will be furnished for each manhole inspected; and (5) Preparing a SSES Summary Report that details areas in which the above work was performed, summarizes work completed to date and includes recommendations, a cost-effectiveness analysis and prioritization analysis for rehabilitation of sewer main/manhole defects and I/I sources identified during this investigation. Estimated rehabilitation construction costs will also be provided.

**Wastewater Flow Monitoring Program:** Project work includes: (1) Installing, calibrating and maintaining flow meters covering the City's wastewater collection system. The flow meters will be installed in Spring 2019; (2) Providing meter data analysis and identifying areas with high I/I quantities; (3) Providing an interim summary report to MassDEP / MWRA; (4) Preparing a work schedule for further study in high incidence areas; (5) Preparing a detailed sewer system rehabilitation plan for those study areas identified with the highest I/I quantities; and (6) Providing a final summary report for MassDEP / MWRA which outlines all findings and recommendations. (Estimated SSES / Flow Monitoring Services Cost = \$300,000).

**Sewer Improvements (Malden Contract 2019-S-1):** Sewer Improvements includes: Developing construction plans and specifications (to remove excessive I/I identified during the above SSES / Wastewater Flow Monitoring work and current DPW maintenance records), followed by CIPP rehabilitation construction (within approximately 20,000 LF of sewer main). [Estimated Design = \$50,000 / Construction = \$600,000 / Construction Services = \$98,000].

Overall project cost is estimated at \$1,048,000. Eligible MWRA I/I Local Financial Assistance (Phase 6) is \$1,048,000. An estimated peak I/I removal total will be established upon SSES / Wastewater Flow Monitoring Program completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF MALDEN, MASSACHUSETTS  
SANITARY SEWER EVALUATION SURVEY  
WASTEWATER FLOW MONITORING PROGRAM  
SEWER IMPROVEMENTS (MALDEN CONTRACT 2019-S-1)  
MWRA PROJECT NO. WRA-P9-18-3-996**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
<b>Sanitary Sewer Evaluation Survey:</b>		
Smoke Testing	Spring 2019	Spring 2019
Flow Isolation	Spring 2019	Summer 2019
TV Inspection	Spring 2019	Summer 2019
Manhole Inspection	Spring 2019	Summer 2019
SSES Summary Report	Summer 2019	Fall / Winter 2019
<b>Wastewater Flow Monitoring Program:</b>		
Metering / Analysis	Spring 2019	Summer 2019
Interim Summary Report	Spring 2019	Summer 2019
Final Summary Report	Fall 2019	Fall / Winter 2019
<b>Sewer Improvements (Malden Contract 2019-S-1):</b>		
Rehabilitation Design	Spring 2019	Spring 2019
Rehabilitation Construction	Summer 2019	Fall / Winter 2019
Warranty Retesting	Fall 2020	Fall 2020

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF NEWTON, MASSACHUSETTS**

**CIP PROJECT 7 SEWER REHABILITATIONS – CONSTRUCTION**

**MWRA PROJECT NO. WRA-P9-24-3-991**

**SCOPE OF SERVICES**

The purpose of this project is to rehabilitate community subareas that contribute excessive I/I, eliminate sanitary sewer contamination to the underdrain system and repair underdrain access points that are contributing infiltration to the sanitary sewer system. The project area includes Newton Subareas A006 / B034 / B035 / B036 / B037 / B038 / B039 / B040 / B073 / B075 / B076 / B077. Project work will include, but not be limited to, the following:

1. Root treatment of 13,150 LF of 6 to 32 x 22-inch diameter sewer main;
2. Install CIPP liners in 25,000 LF of 6 to 32 x 22-inch diameter sewer main;
3. Install structural CIPP liners in 11,175 LF of 6 to 12-inch diameter sewer main;
4. Install shorts liners in 185 LF of 8 to 20-inch diameter sewer main;
5. Install structural short liner in six (6) LF of 12-inch diameter sewer main;
6. Test and grout 45 service connections;
7. Install five (5) lateral liners;
8. Cut 17 protruding service connections;
9. Root treatment of nine (9) sewer manholes; and
10. Line 138 sewer manholes (includes invert sealing, exterior grouting and interior sealing).

The above work will be performed pursuant to the terms and conditions detailed within the Agreement For Engineering Services By and Between the City of Newton and Weston & Sampson Engineers, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received September 17, 2018. Total project cost is estimated at \$6,274,208 (Construction = \$5,524,208 / Construction Services = \$750,000). Eligible MWRA I/I Local Financial Assistance is \$4,580,000 (Phase 11 Allocation Limit). As a result of the above work, an estimated 0.34 mgd of peak I/I will be removed from the collection system.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF NEWTON, MASSACHUSETTS**

**CIP PROJECT 7 SEWER REHABILITATIONS – CONSTRUCTION**

**MWRA PROJECT NO. WRA-P9-24-3-991**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Design	September 2018	May 2019
Design Review/Advertise	May 2019	May 2019
Bid Opening/Contract Award	June 2019	July 2019
Rehabilitation Construction	August 2019	July 2020
Warranty Retesting	April 2021	September 2021

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF QUINCY, MASSACHUSETTS  
CITY-WIDE I/I IDENTIFICATION & REHABILITATION  
MWRA PROJECT NO. WRA-P9-26-3-992**

**SCOPE OF SERVICES**

**Project Type:** The proposed project work will focus on design and construction to rehabilitate pipelines/manholes within the City previously identified as in disrepair and critical for public health and safety, the environment and / or system operation. The high-level goal of the proposed work is to rehabilitate aging sewer pipe in the City in order to reduce the I/I that contributes to a significant amount of the City's sewer flow. The proposed work will also include limited areas for further assessment and inspection to continue to help the City understand the current status of its horizontal wastewater infrastructure assets. The proposed work also includes programmatic elements to facilitate future planning and reporting efforts associated with the sewer collection system understanding and improvements.

In 2011 and 2018, the City conducted Sanitary Sewer Evaluation Surveys (SSES) to refine and pinpoint areas within the collection system that are contributing to extraneous flows and provide recommendations for rehabilitation measures. During each construction season between 2009 and 2018, the City performed sewer projects to remedy I/I and water quality issues.

As part of the 2018 SSES work, a Risk Analysis was conducted to develop a City-Wide consequence of failure (CoF) map which would then facilitate prioritization of future investigation and rehabilitation work. Field investigations provide information needed to assess the physical condition of the asset, estimate contribution to I/I, and determine a likelihood of failure (LoF) for any given asset. Coupling the CoF information with field investigation results allows the City to identify those sewer pipes and manholes that are at high risk for failure and high consequence to the environment and community should those failures occur.

**Project Scope:** The scope of work for this I/I project has three main components: (1) design and construction of rehabilitation of sewers and manholes with known I/I contributions or suspected water quality impacts; (2) field investigations to further the City efforts to understand the physical condition and LoF of its wastewater infrastructure; and (3) I/I program management elements to assist the City in efficiently and effectively managing the I/I reduction program.

**Task 1: I/I Program Support.** In order to develop a cohesive prioritization of sewer repair and replacement throughout the City for I/I reduction and improved water quality and to most efficiently use limited resources, a final aspect of this proposed work includes assembling all available investigation and SSES work performed to-date throughout the City's service area and compiling it into one comprehensive database. The City will use its current GIS database as the basis and framework for data compilation and management moving forward. An updated risk analysis will be conducted to include the 2018 Wollaston Beach field investigations and added to the compiled database. A methodology and strategy will be developed to set priority for I/I rehabilitation and investigation work moving forward that the City can use for future planning and decision making. This task also includes work associated with project and funding management, public outreach, and development of future work packages. This task will be broken down into three (3) sub-tasks accordingly:

- Task 1a. Wollaston Beach Data Analysis / Task 1b. Master GIS Database / Task 1c. Project Management

**Task 2: Field Investigations.** Though pipeline rehabilitation is the main focus of the projects proposed, investigative work will be included in a few select areas. Specifically, there are number of arterial roads that are scheduled for repavement within the next five-year time frame. Should sewers beneath those roadways need to be replaced and/or rehabilitated, that work would ideally be coordinated with any repaving effort. As such, several of the sewers associated with those roadways slated for repaving have been identified for field assessment to understand their current physical condition as well as their contribution to I/I flows. Field investigation of residential sewers in two neighborhoods [Mound Beach and Wollaston (near the Herbert & Sherman Bog)], is included as well due to water quality issues recently identified. The City intends to field inspect approximately 66,000 LF of sewer pipes and associated manholes through this effort.

Field investigations will include flow isolation, CCTV inspection and manholes inspections. Flow isolation will be used to quantify I/I sources within the sewer pipes/manholes being assessed. The flow isolation testing will take place during periods of high groundwater or high tide. Manhole investigations will be conducted by top-side visual inspection of the manhole and findings recorded in a data log and digitally photographed. CCTV inspection will allow for visual identification of defects and/or operational and maintenance concerns. All findings (from both sewer and manhole investigations) will be integrated into the City's sewer system GIS.

**Task 3: I/I Rehabilitation Project Design and Construction.** The proposed projects described below were selected for implementation due to the prioritization of sewers identified through the SSES process conducted to-date as high-risk sewers (high CoF and high LoF). These sewer pipes typically have high I/I and/or are believed to have contributed to public health hazards resulting in beach closures. The type of repair recommended (i.e. open cut vs. CIPP lining) was based upon the findings of the field investigation work (i.e., CCTV) and best engineering practices given the current physical conditions of the asset. Manholes associated with the pipes included in the proposed project list will be assessed and prioritized for rehabilitation during the design phase based upon condition; if selected, manholes will be re-lined as needed (i.e., cementitious lining).

Specific details (by street) for rehabilitation:

Open cut repair (1980 LF Total within 8 to 18-inch sewer pipe) on Barnham Avenue / Island Avenue / Clement Terrace / Peterson Road.

CIPP lining (8236 LF Total within 8 to 30 x 45-inch sewer pipe) on Newcomb Street / Armory Street / Sharon Road / Colby Road / Faxon Road / Botolph Street / Watkins Street / Morse Street / Merrymount Parkway.

The above work will be performed pursuant to the terms and conditions detailed within the Agreement For Engineering Services Agreement By and Between the City of Quincy and Woodard & Curran, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received October 18, 2018.

Total project cost is estimated at \$4,642,800 (I/I Investigation Services = \$463,300 / Design & Construction = \$4,179,500). Eligible MWRA I/I Local Financial Assistance is \$4,642,800. MWRA financial assistance will be comprised of the following funding sources: MWRA Phase 10 / 11 I/I Financial Assistance: \$3,646,039 / Wollaston Beach Area Rehabilitation Phase 1 & 2 Unspent Project Funds: \$667,761 / Avalon Beach & Bay Pointe Marina Sewer Rehabilitation Unspent Project Funds: \$329,000. As a result of the above work, an estimated 0.30 mgd of peak I/I will be removed from the collection system upon contract completion.



**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF QUINCY, MASSACHUSETTS  
CITY-WIDE I/I IDENTIFICATION & REHABILITATION  
MWRA PROJECT NO. WRA-P9-26-3-992**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Task 1: I/I Program Support	November 2018	October 2019
Task 2: Field Investigations	March 2019	June 2019
Task 3: I/I Rehabilitation		
Project Design	November 2018	March 2019
Project Construction	June 2019	December 2019

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9**  
**ATTACHMENT A**  
**FINANCIAL ASSISTANCE AGREEMENT**  
**TOWN OF STOUGHTON, MASSACHUSETTS**  
**YEARS 3 / 4 / 5 I/I REHABILITATION - DESIGN / CONSTRUCTION**  
**YEAR 6 I/I REHABILITATION - DESIGN**  
**YEAR 7 SPRING 2019 I/I INVESTIGATION AND REPORTING - STUDY**  
**MWRA PROJECT NO. WRA-P9-32-3-995**

**SCOPE OF SERVICES**

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. The project area includes Stoughton Subareas 1 - 15. Project work will include, but not be limited to, the following:

1. **Years 3 / 4 / 5 I/I Rehabilitation Design:** Design cost-effective / value-effective sewer rehabilitations for the Years 3 / 4 / 5 Spring 2017 Investigation; prepare construction rehabilitation drawings and specifications for public bidding; and prepare a final cost estimate for the designed rehabilitations. (Estimated Design Services Cost = \$85,000). (Task Order No. FY18 #1)
2. **Years 3 / 4 / 5 I/I Rehabilitation Construction (Additional Rehabilitations):** Construction of cost-effective / value-effective sewer rehabilitations and the performance of construction resident project representative services. Additional sewer rehabilitation work includes approximately: installing 3000 LF of 8 to 10-inch diameter CIP pipe; installing short liners at six (6) locations (within 8 to 21-inch diameter pipe); and rehabilitating 13 manholes; [Estimated Additional Rehabilitations Construction Cost = \$150,000 / Estimated Construction Services Cost (Amendment) = \$24,000].
3. **Year 6 I/I Rehabilitation Design:** Design cost-effective / value-effective sewer rehabilitations for the Year 6 Spring 2018 Investigation; prepare construction rehabilitation drawings and specifications for public bidding; and prepare a final cost estimate for the designed rehabilitations. (Estimated Design Services Cost = \$55,000).
4. **Year 7 Spring 2019 I/I Investigation and Reporting:** TV inspect 25,000 LF of sewer and review TV inspection videotapes of 50,000 LF of sewer in selected sewers within 400-600 feet of the 100-Year Flood Plan. Perform topside manhole inspections of 250 sanitary manholes within 400-600 feet of the 100-Year Flood Plan. (Estimated Investigation Services Cost = \$150,000).

The above work will be performed pursuant to the terms and conditions detailed within the August 24, 2018 Agreement For Engineering Services By and Between the Town of Stoughton and Weston & Sampson Engineers, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received November 7, 2018. Total project cost is estimated at \$464,000 (Design = \$140,000 / Construction = \$150,000 / Construction Services = \$24,000 / Investigation Services = \$150,000). Eligible MWRA I/I Local Financial Assistance is \$400,000. As a result of the above work, an estimated 0.10 mgd of peak I/I will be removed from the collection system upon contract completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT  
TOWN OF STOUGHTON, MASSACHUSETTS  
YEARS 3 / 4 / 5 I/I REHABILITATION - DESIGN / CONSTRUCTION  
YEAR 6 I/I REHABILITATION - DESIGN  
YEAR 7 SPRING 2019 I/I INVESTIGATION AND REPORTING - STUDY  
MWRA PROJECT NO. WRA-P9-32-3-995**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
<u>Years 3 / 4 / 5 I/I Rehabilitation</u>		
Design / Design Review	November 2017	March 2018
Advertise	April 2018	April 2018
Bid Opening	April 2018	April 2018
Contract Award	June 2018	June 2018
Rehabilitation Construction	August 2018	December 2018
Warranty Retesting	April 2019	May 2019
<u>Year 6 I/I Rehabilitation</u>		
Design / Design Review	December 2018	May 2019
Advertise	June 2019	June 2019
Bid Opening	July 2019	July 2019
Contract Award	August 2019	August 2019
Rehabilitation Construction	August 2019	December 2019
Warranty Retesting	April 2020	May 2020
<u>Year 7 Spring 2019 I/I Investigation and Reporting</u>		
Manhole Inspections	March 2019	May 2019
TV Inspection Videotape Review	March 2019	August 2019
Data Review/Report Preparation	August 2019	November 2019

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF WAKEFIELD, MASSACHUSETTS**

**SEWER SYSTEM INFILTRATION REHABILITATION (YEAR 2) - CONSTRUCTION  
(WAKEFIELD CONTRACT 2019-09)**

**MWRA PROJECT NO. WRA-P9-33-3-997**

**SCOPE OF SERVICES**

The purpose of this project is to rehabilitate community sewer basins that contribute excessive I/I to the sanitary sewer system. Project work will include, but not be limited to, the following:

1. Install CIPP liners in 4850 LF of sewer main;
2. Install structural CIPP liners in 510 LF of sewer main;
3. Install CIPP short liners in 60 LF of sewer main (twelve locations);
4. Install structural CIPP short liners in 15 LF of sewer main (two locations);
5. Perform two (2) open cut point repairs;
6. Perform 2515 LF of cleaning and TV inspection;
7. Grout 120 reinstated service connections;
8. Test and grout three (3) service connections;
9. Cut five (5) intruding service connections;
10. Perform 4940 LF of cleaning, inspection, testing and sealing; and
11. Perform 590 VF of cementitious lining in 75 manholes.

The above work will be performed pursuant to the terms and conditions detailed within the Agreement For Engineering Services By and Between the Town of Wakefield and Weston & Sampson Engineers, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received November 19, 2018. Total project cost is estimated at \$526,410 (Construction = \$526,410). Eligible MWRA I/I Local Financial Assistance is \$526,410 (Phase 11 Distribution). As a result of the above work, an estimated 0.05 mgd of peak I/I will be removed from the collection system.

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Bid Opening/Contract Award	November 2018	November 2018
Rehabilitation Construction	January 2019	May 2019
Warranty Retesting	March 2020	May 2020

## MWRA I/I Local Financial Assistance Program Funding Summary

February 2019 Funding Cycle

<u>Community</u>	<u>Funding Allocation</u>
Braintree	\$ 878,200
Cambridge	\$ 11,250,500
Framingham	\$ 1,548,000
Melrose	\$ 1,081,000
Stoneham	\$ 970,000
Watertown	\$ 1,050,000
Winthrop	\$ 259,500
Woburn	\$ 1,990,000
Total	\$ 19,027,200

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF BRAINTREE, MASSACHUSETTS  
I/I INVESTIGATION AND REHABILITATION PROGRAM - YEAR 8  
MWRA PROJECT NO. WRA-P11-06-3-1104**

**SCOPE OF SERVICES**

The purpose of this project is to identify and rehabilitate community sewer subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. Project work will include, but not be limited to, the following:

**Year 8 I/I Investigation - Study / Design / Bid & Award (Est. Cost = \$ 281,000)**

1. Flow isolate as much as 52,800 LF of sewer in Braintree Sewer Subareas E3 / K1 / L2 / L4 / W1 to quantify infiltration amounts within manhole-to-manhole segments of sewer. The inspection will be conducted between the hours of 12AM and 6AM when groundwater levels are typically at their highest and sanitary flows are at a minimum.
2. Clean, TV inspect, videotape and record as much as 54,700 LF of sewer in Braintree Sewer Subareas E3 / K1 / L2 / L4 / W1. The TV inspection will be performed to locate problem areas and I/I sources within manhole-to-manhole segments of sewer. The inspection will be conducted in Spring 2019 when groundwater levels are typically at their highest.
3. Conduct a topside physical survey of as many as 320 sewer manholes in Braintree Sewer Subareas E3 / K1 / L2 / L4 / W1 to identify defects and I/I sources. A written log will be furnished for each manhole inspected.
4. Prepare a letter report that details areas in which work was performed, summarizes work completed to date and includes recommendations, a cost-effectiveness analysis and prioritization analysis for rehabilitation of pipeline/manhole defects and I/I sources identified during this investigation. [Study = \$216,000 / Design (with Bid & Award) = \$65,000]

**Year 8 I/I Investigation - Construction / Construction Services (Est. Cost = \$ 597,200)**

Construction plans and specifications (to remove excessive I/I identified during the above Year 8 I/I Investigation) will be developed and submitted, followed by rehabilitation construction. [Construction = \$487,200 / Construction Services = \$110,000]

Total project cost is estimated at \$878,200. Eligible MWRA I/I Local Financial Assistance is \$878,200. As a result of the above work, an estimated 0.40 mgd of peak I/I will be removed from the collection system upon contract completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF BRAINTREE, MASSACHUSETTS  
I/I INVESTIGATION AND REHABILITATION PROGRAM - YEAR 8  
MWRA PROJECT NO. WRA-P11-06-3-1104**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
<b>Year 8 I/I Investigation / Rehabilitation:</b>		
I/I Investigation and Reporting	March 2019	November 2019
Design	February 2020	April 2020
Bid and Award	May 2020	June 2020
Construction	July 2020	November 2020
Warranty Retesting	March 2021	March 2021

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF CAMBRIDGE, MASSACHUSETTS  
THE PORT INFRASTRUCTURE IMPROVEMENTS PROJECT:  
PARKING LOT NO. 6 (PL6) STORMWATER STORAGE TANK  
AND COMBINED SEWER FLOW REDUCTION  
MWRA PROJECT NO. WRA-P11-09-3-1105**

**SCOPE OF SERVICES**

The purpose of this construction project is to reduce the combined sewer flows in the Cambridge CAM017 catchment area, particularly within the Cardinal Medeiros Interceptor and Binney Street Combined Sewer which surcharge during rain events as small as a 1-year, 6-hour event. A large portion of the stormwater in this area has been separated but currently discharges back to the combined sewer system. There are separated storm drains along south Massachusetts Avenue; however, the MBTA Red Line tunnel prevents access to these storm drains. This project will allow for this stormwater to be completely separated.

The project area is located in the Port neighborhood of the City along Bishop Allen Drive (between Prospect Street and School Street). The stormwater holding tank will be situated in Cambridge City Parking Lot No. 6 (PL6) located on Bishop Allen Drive (between Columbia Street and Douglass Street). Construction of the 120' x 36' x 20' cast-in-place concrete stormwater holding tank includes an underground pumping station containing three 3600 gpm pumps. To direct the stormwater flows from the PL6 pump station into the south Massachusetts Avenue storm drains, force mains will be installed within a 63-inch diameter steel casing (195 feet long and 50 feet below grade) constructed (via auger boring) beneath the MBTA Red Line tunnel. This will reduce wet weather flows in the Port neighborhood (particularly along Bishop Allen drive and Massachusetts Avenue). By removing the flow from the CAM017 catchment, flows received by the Cardinal Medeiros Interceptor will also decrease.

In addition to the construction of the PL6 stormwater holding tank, project work will include redirecting existing illicit connections to the stormwater mains to the sanitary sewer, installing new stormwater piping, manhole and catch basins on Essex Street and Bishop Allen Drive; constructing a flap valve structure on School Street; performing a common manhole separation on Massachusetts Avenue; and the performance of all other work pursuant to the terms and conditions detailed within the plans and specifications for the City of Cambridge, Massachusetts: The Port - PL6 Stormwater Storage Tank Project and the approved MWRA Phase 11 I/I Local Financial Assistance Project Application received January 15, 2019.

Total project construction cost is estimated at \$19,520,004. Eligible MWRA I/I Local Financial Assistance is \$11,250,500 [Eligible Cost based upon City's remaining MWRA Phases 9-11 financial assistance; additional project funding (\$6,502,545) was provided under MWRA Project No. WRA-P9-09-3-976].



**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF CAMBRIDGE, MASSACHUSETTS  
THE PORT INFRASTRUCTURE IMPROVEMENTS PROJECT:  
PARKING LOT NO. 6 (PL6) STORMWATER STORAGE TANK  
AND COMBINED SEWER FLOW REDUCTION  
MWRA PROJECT NO. WRA-P11-09-3-1105**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Construction	July 2018	December 2020

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A-1  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF FRAMINGHAM CONTRACT NO. PW-369  
UNION AVENUE AREA SEWER IMPROVEMENTS - CONTRACT 2  
(EVERGREEN STREET SEWER REHABILITATION)  
MWRA PROJECT NO. WRA-P11-14-3-1101**

**SCOPE OF SERVICES**

The proposed project includes contracted sewer main / manhole rehabilitation and replacement in the Union Avenue area of the City of Framingham. Much of the existing infrastructure in this area has been in service well beyond its expected design life (sewers in this area were installed in between 1914 and 1957) and require above average maintenance attention.

Work to be performed under this project includes, but is not necessarily limited to: replacement of approximately 1550 LF of 8-inch VC sewer main; replacement of approximately 375 LF of sewer service laterals; CIP lining of approximately 475 LF of 8-inch VC sewer main; replacement of approximately 11 sewer manholes; and the performance of all other work pursuant to the terms and conditions detailed within the plans and specifications of Framingham Contract No. PW-369 (Union Avenue Area Utility Improvements - Contract 2) and the approved MWRA Phase 11 I/I Local Financial Assistance Project Application received December 28, 2018.

The project's work area includes: Evergreen Street / Learned Street / Myrtle Street / Thurber Street / Lincoln Street.

Total project cost is estimated at \$648,000. Eligible MWRA I/I Local Financial Assistance is \$648,000 (Rehabilitation Construction = \$589,281 / Construction Administration & Resident Inspection = \$58,719). As a result of the above work, an estimated 0.04 mgd of peak infiltration will be removed from the collection system upon contract completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B-1  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF FRAMINGHAM CONTRACT NO. PW-369  
UNION AVENUE AREA SEWER IMPROVEMENTS - CONTRACT 2  
(EVERGREEN STREET SEWER REHABILITATION)  
MWRA PROJECT NO. WRA-P11-14-3-1101**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Design	June 2017	February 2018
Bid/Award	March 2018	April 2018
Construction	May 2018	October 2019
Project Closeout	November 2019	January 2020

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A-2  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF FRAMINGHAM CONTRACT NOS. PW-375 / 379  
SEWER DEFECTS REPAIRS PHASE 2  
MWRA PROJECT NO. WRA-P11-14-3-1102**

**SCOPE OF SERVICES**

The proposed project includes contracted sewer main / manhole rehabilitation and replacement throughout the City of Framingham. Phase 1 repairs (implemented in late 2017) corrected defects at and south of Waverly Street. Phase 2 addresses repairs between Worcester Road (Route 9) and Waverly Street to the southerly City limits and in the vicinity of Concord Street to the City limits in East Framingham.

The work will be coordinated, overseen and performed by City wastewater operations and engineering staff, augmented by an on-call trenchless utility rehabilitation contractor (Contract No. PW-375: Green Mountain Pipeline Services) and an on-call sewer collection system maintenance contractor (Contract No. PW-379: Rapid Flow).

Work to be performed under this project includes, but is not necessarily limited to: cleaning and television inspection of 55,000 LF of sewer main; root treatment of 3000 LF of sewer main; testing and sealing of 140 sewer main joints; CIPP spot repairs within 150 LF of sewer main; CIP lining of 15,150 LF of sewer main; lining 90 LF of sewer service connections; lining 1140 VF of sewer manholes; performing 50 spot sewer manhole repairs; rebuilding 10 sewer manhole inverts; flow isolating 6175 LF of sewer main; and the performance of all other work pursuant to the terms and conditions detailed within Framingham Contract Nos. PW-375 / 379 and the approved MWRA Phase 11 I/I Local Financial Assistance Project Application received January 10, 2019.

Total project cost is estimated at \$900,000. Eligible MWRA I/I Local Financial Assistance is \$900,000. As a result of the above work, an estimated 0.11 mgd of peak infiltration will be removed from the collection system upon contract completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B-2  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF FRAMINGHAM CONTRACT NOS. PW-375 / 379  
SEWER DEFECTS REPAIRS PHASE 2  
MWRA PROJECT NO. WRA-P11-14-3-1102**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Construction	July 2018	December 2019

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF MELROSE, MASSACHUSETTS  
2018 SEWER REHABILITATION (OPEN-CUT) PROJECT  
FALL 2018 SEWER MANHOLE LINING PROJECT  
SPRING 2019 SEWER SYSTEM EVALUATION SURVEY  
MWRA PROJECT NO. WRA-P11-20-3-1103**

**SCOPE OF SERVICES**

The purpose of this project is to identify and rehabilitate community sewer subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. Project work will include the following:

**2018 Sewer Rehabilitation (Open-Cut) Project:** Work to be performed under this project includes: replacement of approximately 1550 LF of 6 and 8-inch VC sewer pipe with 8-inch PVC sewer pipe and appurtenances; replacement of approximately 250 LF of 12-inch VC sewer pipe with 12-inch PVC sewer pipe and appurtenances; performing open-cut point repairs in approximately 150 LF of 8-inch sewer pipe and appurtenances; performing open-cut point repairs in approximately 50 LF of 10-inch sewer pipe and appurtenances. Public Bids were opened in August 2018 with Unified Contracting the low bidder at \$871,850. Weston & Sampson will provide construction office & field services (\$46,600).

**Fall 2018 Sewer Manhole Lining Project:** Work to be performed under this project includes: Manhole Rehabilitations of approximately 215 VF of manholes at 24 locations. (Estimated Project Cost = \$32,250)

**Spring 2019 Sewer System Evaluation Survey:** (Estimated Project Cost = \$298,540) Work to be performed under this project includes: (1) Performing flow isolation in 62,000 LF of sewer main to quantify infiltration amounts within manhole-to-manhole segments of sewer mains; (2) Cleaning, TV inspection, videotaping and recording in 62,000 LF of sewer main to locate problem areas and I/I sources within manhole-to-manhole segments of sewer mains. The inspection will be conducted in Spring 2019 when groundwater levels are typically at their highest; (3) Conducting topside physical survey of 400 sewer manholes to identify defects and I/I sources. A written log will be furnished for each manhole inspected; and (4) Preparing a letter report that details areas in which work was performed, summarizes work completed to date and includes recommendations, a cost-effectiveness analysis and prioritization analysis for rehabilitation of pipeline/manhole defects and I/I sources identified during this investigation.

Also included within this funding is a City Force Account charge (\$40,000) associated with a Project Engineer within the City Engineering Division to oversee all phases of these projects. Police Details costs (\$80,000) are also included within this funding.

Total cost for the above three projects is estimated at \$1,369,240. Eligible MWRA I/I Local Financial Assistance is \$1,081,000.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT  
CITY OF MELROSE, MASSACHUSETTS  
2018 SEWER REHABILITATION (OPEN-CUT) PROJECT  
FALL 2018 SEWER MANHOLE LINING PROJECT  
SPRING 2019 SEWER SYSTEM EVALUATION SURVEY  
MWRA PROJECT NO. WRA-P11-20-3-1103**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
<b>2018 Sewer Rehabilitation (Open-Cut) Project:</b>		
Construction	October 2018	June 2019
<b>Fall 2018 Sewer Manhole Lining Project:</b>		
Construction	September 2018	June 2019
<b>Spring 2019 Sewer System Evaluation Survey:</b>		
I/I Investigation and Reporting	March 2019	December 2019

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF STONEHAM, MASSACHUSETTS  
PHASE 7 SEWER SYSTEM I/I REHABILITATION (STUDY AREA 4)  
MWRA PROJECT NO. WRA-P11-31-3-1107**

**SCOPE OF SERVICES**

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. Phase 7 Sewer System I/I rehabilitation work will be conducted primarily in Stoneham Study Area 4.

Investigations conducted in 2018 included CCTV inspection of approximately 40,000 LF of 6 to 15-inch diameter sewer main and inspection of approximately 250 sewer manholes. Rehabilitation recommendations from these inspections included:

1. CIP lining of approximately 21,000 LF of sewer main;
2. Grouting sewer service connections;
3. Performing approximately 30 CIP spot repairs;
4. Cementitious lining of approximately 40 sewer manholes; and
5. Conducting limited smoke testing within suspect inflow areas.

Total project cost is estimated at \$1,945,000. Eligible MWRA I/I Local Financial Assistance is \$970,000 (Study/Planning/Design = \$145,000 / Construction Engineering = \$200,000 / Construction = \$625,000). As a result of the above work, an estimated 0.20 mgd of peak I/I will be removed from the collection system upon contract completion.



**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF STONEHAM, MASSACHUSETTS  
PHASE 7 SEWER SYSTEM I/I REHABILITATION (STUDY AREA 4)  
MWRA PROJECT NO. WRA-P11-31-3-1107**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Planning / Design	March 2019	August 2019
Bidding / Award	August 2019	September 2019
Construction	November 2019	November 2020

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF WATERTOWN, MASSACHUSETTS  
CIP PROJECT 1: I/I INVESTIGATION & REHABILITATION PROGRAM  
(SEWER SUBAREAS 2 / 6 / 7 / 14 / 18)**

**MWRA PROJECT NO. WRA-P11-36-3-1109**

**SCOPE OF SERVICES**

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. CIP Project 1 includes three sanitary sewer evaluation surveys (SSES). The first SSES was funded under MWRA Project No. WRA-P9-36-3-980. Project work will for the next two SSESs will include, but not be limited to, the following:

1. Light clean, TV inspect, videotape and record as much as 28,830 LF of sewer in Watertown Sewer Subareas 6 / 7 (Howard Street). Light clean, TV inspect, videotape and record as much as 26,185 LF of sewer in Watertown Sewer Subareas 2 / 14 / 18 and Arsenal Street. The TV inspection will be performed to locate problem areas and I/I sources within manhole-to-manhole segments of sewer.
2. Conduct topside physical survey of as many as 133 sewer manholes in Watertown Sewer Subareas 6 / 7 (Howard Street). Conduct topside physical survey of as many as 129 sewer manholes in Watertown Sewer Subareas 2 / 14 / 18 and Arsenal Street. The surveys will identify defects, I/I sources and underdrain access points. A written log will be furnished for each manhole inspected.
3. Prepare a letter report that details areas in which work was performed, summarizes work completed to date and includes recommendations, a cost-effectiveness analysis, a transportation & treatment cost analysis and prioritization analysis for rehabilitation of pipeline/manhole defects and I/I sources identified during the investigation.
4. Using the information collected in the above investigation, cost-effective rehabilitation design will be performed. In addition, specifications and plans will be prepared for public bidding. A final opinion of probable construction cost will be estimated. Phase I construction will begin Summer 2019 and is being partially funded through MWRA Project No. WRA-P9-36-3-980.

Total project cost is estimated at \$1,080,000. Eligible MWRA I/I Local Financial Assistance is \$1,050,000 (MWRA Phase 10 Allocation Total) (Construction = \$1,050,000).

Project work will be performed pursuant to the terms and conditions detailed within the approved MWRA Phase 11 I/I Local Financial Assistance Project Application (received January 23, 2019) and the Agreement For Engineering Services By And Between The Town of Watertown, MA And Weston & Sampson Engineers, Inc. As a result of the above work, an estimated 0.20 mgd of peak I/I will be removed from the collection system upon contract completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF WATERTOWN, MASSACHUSETTS  
CIP PROJECT 1: I/I INVESTIGATION & REHABILITATION PROGRAM  
(SEWER SUBAREAS 2 / 6 / 7 / 14 / 18)**

**MWRA PROJECT NO. WRA-P11-36-3-1109**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
I/I Investigation and Evaluation	March 2018	December 2018
Design	January 2019	March 2019
Rehabilitation Construction	June 2019	September 2020

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF WINTHROP: WASTEWATER FLOW MONITORING & I/I ANALYSIS  
MWRA PROJECT NO. WRA-P11-42-1-1110**

**SCOPE OF SERVICES**

The purpose of this project is to identify community sewer subareas that contribute excessive I/I. Contracted engineering services will be provided to develop the Town's Sewer System I/I Analysis Plan in accordance with the requirements of 314 CMP 12.00. The I/I Analysis Plan will follow the MassDEP Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys (dated May 2017). Project work will include, but not be limited to, the following:

**Task 1 - Review Available Information:** Available I/I investigation reports, system mapping, sanitary sewer subarea delineation, reports of overflows/backups in the public sewer system for the past ten years and other pertinent information relative to the I/I within the Town's sewer collection system will be reviewed. The available reports and information will be used to assist with identifying subareas, areas of potential concern and provide historical information in support of the I/I Analysis Plan. Manhole numbering systems, established under previous reports, will be maintained.

**Task 2 - Flow Monitoring:** Continuous flow monitoring will be performed to obtain information necessary to accurately analyze subareas for infiltration during high groundwater periods and for rainfall-related inflow during wet weather periods. Flow monitoring will be accomplished through either continuous monitoring flow meters incorporating a velocity sensor combined with a depth sensor or, in areas with high flow or surcharge conditions, the use of Palmer Bowlus flumes, in conjunction with continuous depth recording. Up to thirteen (13) flow meters will be installed at various locations throughout the sewer collection system for a maximum 10-week period to record flow rates during wet and dry periods. Flow metering data will be downloaded daily. In addition, one (1) recording tipping bucket rainfall gauge (along with groundwater gauges) will be installed for the monitoring period. Flow isolation will also be performed at select locations to isolate reaches of the sewer collection system not included under the metering coverage area.

**Task 3 - I/I Analysis:** Data from Task 2 will be evaluated to develop peak infiltration estimates in each subarea. Inflow analysis will include a review of data to determine the difference in peak hour flows between wet and dry weather conditions. A correlation between recorded storm events and a theoretical 1-year, 6-hour storm event will be established to estimate the peak inflow for each subarea. The risk of SSOs occurring from a 5-year, 24-hour storm event will also be included in the analysis. Upon completion of the analysis, each subarea will be ranked for their potential to contribute I/I to the collection system. This prioritization will be used to develop future phases of the Town's I/I program, including the SSES required by MassDEP.

Total project cost is estimated at \$259,500 (Flow Monitoring & I/I Analysis: \$249,500 / Police Details: \$10,000). Eligible MWRA I/I Local Financial Assistance is \$259,500. Project work will be performed pursuant to the terms and conditions detailed within the approved MWRA Phase 11 I/I Local Financial Assistance Project Application (received January 29, 2019) and the Engineering Services Agreement For I/I Analysis Program By And Between The Town of Winthrop, MA And Woodard & Curran, Inc.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF WINTHROP: WASTEWATER FLOW MONITORING & I/I ANALYSIS  
MWRA PROJECT NO. WRA-P11-42-1-1110**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Flow Monitoring	March 2019	May 2019
I/I Analysis	May 2019	September 2019
Report & Recommendations	October 2019	November 2019

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF WOBURN, MASSACHUSETTS  
CIP PROJECT 3 I/I REHABILITATION - CONSTRUCTION  
MWRA PROJECT NO. WRA-P11-43-3-1108**

**SCOPE OF SERVICES**

The purpose of this project is to identify and rehabilitate community sewer mini-systems that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule.

Project work will include rehabilitations in CIP 1 Project area, CIP 2 Project area and CIP 3 Project area. The CIP 1 Project area includes the Cross Street (CS) subarea. The CIP 2 Project area includes Sewer Mini-Systems ES-01 / ES-02 / ES-03 / ES-04 / ES-05. The CIP 3 Project area includes Sewer Mini-Systems ES-18 / ES-20. This project is part of Woburn's East Woburn Sewer Capital Improvement Plan.

Project rehabilitation work will include, but not be limited to: Cleaning / inspecting / testing and sealing sewer main; performing root treatment; installing CIP pipe; installing short liners; performing open cut point repairs; grouting service connections; rehabilitating sewer manholes; and replacing sewer manhole frames & covers (Construction = \$1,660,000 / Construction Services = \$330,000).

Total project cost is estimated at \$1,990,000. Eligible MWRA I/I Local Financial Assistance is \$1,990,000 (MWRA Phase 11 Total Funding Allocation). As a result of the above work, an estimated 0.20 mgd of peak I/I will be removed from the collection system upon contract completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF WOBURN, MASSACHUSETTS  
CIP PROJECT 3 I/I REHABILITATION - CONSTRUCTION  
MWRA PROJECT NO. WRA-P11-43-3-1108**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Design	September 2018	April 2019
Bid and Award	April 2019	May 2019
Construction	June 2019	December 2019
Retesting	April 2020	May 2020

**MWRA I/I Local Financial Assistance Program Funding Summary**  
**May 2019 Funding Cycle**

<u>Community</u>	<u>Funding Allocation</u>
Arlington	\$ 800,000
Bedford	\$ 440,058
Burlington	\$ 1,110,000
Framingham	\$ 1,271,090
Reading	\$ 1,040,000
Somerville	\$ 1,999,100
Stoughton	\$ 130,000
Waltham	\$ 3,849,500
Wilmington	\$ 428,000
Total	\$ 11,067,748



**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF ARLINGTON, MASSACHUSETTS**

**PHASE #11 SANITARY SEWER REHABILITATIONS  
PHASE #9 POST-CONSTRUCTION FLOW EVALUATION**

**MWRA PROJECT NO. WRA-P11-01-3-1117**

**SCOPE OF SERVICES**

The purpose of these projects is to identify and rehabilitate community sewer subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. Project work will include, but not be limited to, the following:

**Phase #11 Sanitary Sewer Rehabilitation Construction:** Construction of cost-effective / value-effective sewer rehabilitations. Sewer rehabilitation work includes: performing 1553 LF of sewer pipe root treatment; cleaning and inspecting 604 LF of 8-inch sewer; testing (48) 8-inch pipe joints; sealing (30) 8-inch pipe joints; installing 50 LF of 8-inch PVC gravity sewer; CIP pipe lining of 7536 LF of 6, 8 and 12-inch sewer pipe; installing eight (8) LF of CIP short liners; installing five (5) CIP lateral liners; grouting 162 reinstated service connections; grouting 10 service connections; installing 45 LF of 6-inch PVC building connections; cutting three (3) protruding service connections; performing cementitious lining of existing sewer manholes (2314 VF); grouting seven (7) sewer manholes; installing two (2) sewer manhole inflow dishes; furnishing & installing two (2) manhole frames & covers; raising two (2) manholes frames & covers to grade; performing 8140 LF of post-construction flow isolation; and the performance of all other work pursuant to the terms and conditions detailed within the plans and specifications of the Town of Arlington Phase #11 Sanitary Sewer Rehabilitations and the approved MWRA Phase 11 I/I Local Financial Assistance Project Application received April 18, 2019. Project work is located in Arlington Investigation Areas #1 through #11.

**Phase #9 Post-Construction Flow Evaluation:** Flow Evaluation work includes: compiling and reviewing flow isolation data collected as part of the Phase #9 Sanitary Sewer Rehabilitation Project (MWRA Project No. WRA-P9-01-3-960); preparing a line segment to line segment comparison of flow isolation data; and providing an estimate of the infiltration removed during the Phase #9 Sanitary Sewer Rehabilitation Project.

Overall project cost is estimated at \$800,000. Eligible MWRA I/I Local Financial Assistance is \$800,000 (Phase #11 Sanitary Sewer Rehabilitation Construction: \$635,000 / Phase #11 Sanitary Sewer Rehabilitation Construction Services: \$150,000 / Phase #9 Post-Construction Flow Evaluation: \$15,000). As a result of the above Phase #11 Sanitary System Rehabilitation work, an estimated 0.04 mgd of peak infiltration will be removed from the collection system upon contract completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF ARLINGTON, MASSACHUSETTS**

**PHASE #11 SANITARY SEWER REHABILITATIONS  
PHASE #9 POST-CONSTRUCTION FLOW EVALUATION**

**MWRA PROJECT NO. WRA-P11-01-3-1117**

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
<b>Phase #11 Sanitary Sewer Rehabilitations:</b>		
Construction	May 2019	November 2019
Warranty Retesting	May 2020	June 2020
<b>Phase #9 Post-Construction Flow Evaluation:</b>		
Study	May 2019	August 2019

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**PROJECT NO. WRA-P11-03-3-1115**

**TOWN OF BEDFORD**

**CONSTRUCTION & CONSTRUCTION SERVICES OF SEWER AND  
MANHOLE REHABILITATION (PHASE #5);  
& TOWN-WIDE SUMP PUMP SURVEY**

**SCOPE OF SERVICES**

The purpose of this project is to reduce I/I through rehabilitating manholes and sewer pipes in specific community sewer areas. The project is part of an ongoing I/I program. The Work is based primarily on the recommendations of the May 2018, Weston & Sampson report titled "Phase #5 Sewer System Investigation Report". This project is part of a multi-phased sewer rehabilitation project for the Town and will include, but not be limited to, the following:

Installing (1) - 8 inch PVC gravity sewer on Ashby Road, (1) sewer manhole on Ashby Road, 113 vertical feet of cementitious lining of manholes; grouting and patching of 79 manholes; raising 6 manhole frame & covers to grade; installing 15 bolted & gasketed manhole frames & covers, 3 manhole inflow dishes, 15 manhole chimney seals, 6 cured-in-place short liners, 240 L.F. cured-in-place pipe for 8-inch sewers, 472 L.F. cured-in-place pipe for 21-inch sewers; cleaning/inspecting/testing of 10 service connections; grouting 10 service connections; cutting 1 protruding service connection; cleaning/inspecting 3,047 L.F. of 8-inch sewers; testing (243) 8-inch joints; sealing (122) 8-inch joints. The Work will also include a Town-wide Sump Pump Survey project that will help identify sources of private inflow. The construction will include the performance of all other work pursuant to the terms and conditions detailed within the project's plans and specifications and the MWRA Phase 11 I/I Local Financial Assistance Project Application received April 9, 2019.

Total project cost is estimated at \$440,058. Eligible MWRA I/I Local Financial Assistance is \$440,058 (Eligible Phase #5 Construction / Const. Services Cost = \$372,058 / Eligible Planning Cost (Sump Pump Survey) = \$68,000). As a result of the above work, an estimated 0.06 mgd of peak infiltration will be removed from the collection system upon contract completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**PROJECT NO. WRA-P11-03-3-1115**

**TOWN OF BEDFORD**

**CONSTRUCTION & CONSTRUCTION SERVICES OF SEWER AND  
MANHOLE REHABILITATION (PHASE #5);  
& TOWN-WIDE SUMP PUMP SURVEY**

**PROJECT SCHEDULE**

<u>Description of Work</u>	<u>Start Date</u>	<u>Completion Date</u>
Phase 5 Construction	June 2019	June 2020
Town-wide Sump Pump Survey	May 2019	April 2020

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**MWRA PROJECT NO. WRA-P11-08-3-1119**

**TOWN OF BURLINGTON**

**CIP PROJECT 9 SSES – STUDY  
PHASE 8 AND 9 SEWER SYSTEM REHABILITATIONS: DESIGN/CONSTRUCTION  
CIP PROJECT 10 SSES – STUDY**

**SCOPE OF SERVICES**

The purpose of these projects is to reduce I/I through rehabilitating manholes and sewer pipes in specific community sewer areas. The projects are part of the Town's Sewer Capital Improvement Program (CIP). These projects are part of a multi-phased sewer rehabilitation project for the Town and will include studies (investigations), design, construction, and construction services.

The CIP Project 9 SSES Study will include but not be limited to, the following: field investigations, flow isolation and television inspection, as well as project mapping, data analysis, preliminary design, cost effective analysis, and reporting, in order to identify and quantify sources of infiltration and inflow.

The CIP Phase 8 and 9 Rehabilitations will include design and construction of trenchless technology to eliminate infiltration and inflow from the sanitary sewer system.

The CIP Project 10 SSES Study will include but not be limited to, the following: field investigations, flow isolation and television inspection, as well as project mapping, data analysis, preliminary design, cost effective analysis, and reporting, in order to identify and quantify sources of infiltration and inflow.

The construction phase will include the performance of all other work pursuant to the terms and conditions detailed within the project's plans and specifications and the MWRA Phase 11 I/I Local Financial Assistance Project Application received April 26, 2019.

Total project cost is estimated at \$1,267,933. Eligible MWRA I/I Local Financial Assistance is \$1,110,000 (Phase 11 allocation limit). Estimated I/I removal will be determined upon contract completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**MWRA PROJECT NO. WRA-P11-08-3-1119**

**TOWN OF BURLINGTON**

**CIP PROJECT 9 SSES – STUDY  
PHASE 8 AND 9 SEWER SYSTEM REHABILITATIONS: DESIGN/CONSTRUCTION  
CIP PROJECT 10 SSES – STUDY**

**PROJECT SCHEDULE**

<u>Description of Task</u>	<u>Start Date</u>	<u>Completion Date</u>
Phase 9 SSES Study	February 2019	November 2019
CIP Project 8 & 9 Design, Bid & Award	November 2019	April 2020
CIP Project 8 & 9 Construction of Rehabilitations	May 2020	November 2020
CIP Project 8 & 9 Re-test & Warranty Inspection	April 2021	April 2021
Phase 10 SSES Study	February 2020	November 2020

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF FRAMINGHAM CONTRACT PW-402  
WORCESTER ROAD WASTEWATER INFRASTRUCTURE IMPROVEMENTS  
(PHASE I - EASTBOUND)**

**MWRA PROJECT NO. WRA-P11-14-3-1112**

**SCOPE OF SERVICES**

The proposed project includes contracted wastewater infrastructure replacement along Worcester Road in the City of Framingham. Phase I work is located along the eastbound side of Worcester Road (Concord Street to Natick Town Line) and includes residential work along Pierce Street and Dinsmore Avenue.

Eligible work to be performed under this project includes, but is not necessarily limited to: installation of 600 LF of 8-inch PVC and DI gravity sewer piping; installation of 930 LF of 10-inch PVC gravity sewer piping; installation of 710 LF of 12-inch PVC gravity sewer piping; installation of 6-inch PVC gravity sewer piping for sewer service connections; installation of 12 sewer manholes; cleaning and TV inspection of 5820 LF of storm drain; and the performance of all other work pursuant to the terms and conditions detailed within the plans and specifications of Framingham Contract No. PW-402 (Worcester Road Water and Sewer Improvements - Phase I Eastbound) and the approved MWRA Phase 11 I/I Local Financial Assistance Project Application received March 26, 2019.

Total Phase I construction cost is estimated at \$5,225,000. Eligible MWRA I/I Local Financial Assistance is \$1,271,090 (MWRA I/I Program Phase 9 Funding Limit). As a result of the above work, an estimated 0.10 mgd of peak infiltration will be removed from the collection system upon contract completion.

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Bid/Award	March 2019	May 2019
Construction	June 2019	December 2020

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11**  
**ATTACHMENT A**  
**FINANCIAL ASSISTANCE AGREEMENT**  
**PROJECT NO. WRA-P11-28-3-1114**  
**TOWN OF READING**

**DESIGN AND CONSTRUCTION OF SEWER AND  
MANHOLE REHABILITATION (PHASE C)**

**SCOPE OF SERVICES**

The purpose of this project is to reduce I/I through rehabilitating manholes and sewer pipes in specific community sewer areas. The project is part of an ongoing I/I program. The Work is based primarily on the recommendations of the August 2010 and November 2012, CDM Smith reports titled "Infiltration and Inflow Investigations" (the 2010 and 2012 Reports). This project is part of a multi-phased sewer rehabilitation project for the Town and will include, but not be limited to, the following:

The recommended sewer rehabilitations will primarily consist of the design and installation of 16,000 feet of Cured-in-Place Pipe Lining (CIPPL) throughout the town (Reading is preparing plans and specifications that will be ready for bidding by Fall 2019). The construction may also include the sealing of approximately 55 manholes; and the performance of all other work pursuant to the terms and conditions detailed within the project's plans and specifications and the MWRA Phase 11 I/I Local Financial Assistance Project Application received April 9, 2019.

Total project cost is estimated at \$1,340,000. Eligible MWRA I/I Local Financial Assistance is \$1,040,000 (MWRA Phase 11 Total Funding Allocation) (Eligible Design Cost = \$82,969 / Eligible Construction Cost = \$957,031). As a result of the above work, an estimated 0.38 mgd of peak I/I will be removed from the collection system upon contract completion.



**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**PROJECT NO. WRA-P11-28-3-1114**

**TOWN OF READING**

**DESIGN AND CONSTRUCTION OF SEWER AND  
MANHOLE REHABILITATION (PHASE C)**

**PROJECT SCHEDULE**

<u>Description of Work</u>	<u>Start Date</u>	<u>Completion Date</u>
Project Bid & Award	August 2019	September 2019
Construction	September 2019	December 2020

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF SOMERVILLE, MASSACHUSETTS  
CIP PROJECT 1 SEWER MANHOLE REHABILITATION  
MWRA PROJECT NO. WRA-P11-30-3-1111**

**SCOPE OF SERVICES**

The proposed project includes contracted sewer manhole rehabilitation throughout the City of Somerville. The rehabilitations were designed as part of the CIP Project 1 Manhole Inspection / Assessment and Design Project. A preliminary design of rehabilitations was completed during the reporting phase of the project and detailed within the Weston & Sampson Engineers report titled *CIP Project 1 Manhole Inspection and Assessment (March 2018)*.

Work to be performed under this project includes, but is not necessarily limited to: chemical root treatment of 20 sewer manholes; cementitious lining of sewer manholes (4620 VF); building benches and inverts in 110 sewer manholes; replacing 147 sewer manhole frames and covers; raising and replacing five (5) sewer manhole frames and covers; furnishing and installing 58 sewer manhole inflow dishes; redirecting six (6) sewer manhole access ports; sealing five (5) sewer manhole access ports; sealing underdrain inverts in four (4) sewer manholes; plugging two (2) underdrain pipe connections; and the performance of all other work pursuant to the terms and conditions detailed within the City of Somerville CIP Project 1 Manhole Rehabilitations Contract Documents and the approved MWRA Phase 11 I/I Local Financial Assistance Project Application received January 28, 2019.

Total project cost is estimated at \$1,999,100. Eligible MWRA I/I Local Financial Assistance is \$1,999,100 (Rehabilitation Construction = \$1,518,800 / Construction Services = \$480,300). As a result of the above work, an estimated 0.17 mgd of peak I/I will be removed from the collection system upon contract completion.

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Construction	June 2019	December 2019
Warranty Retesting Inspections	March 2020	May 2020

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT  
TOWN OF STOUGHTON, MASSACHUSETTS  
YEARS 3 / 4 / 5 I/I REHABILITATION (CONTRACT 18-1): CONSTRUCTION  
MWRA PROJECT NO. WRA-P11-32-3-1120**

**SCOPE OF SERVICES**

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. The project area includes Stoughton Subareas 1 - 15. Project work will include, but not be limited to, the following:

**Years 3 / 4 / 5 I/I Rehabilitation Construction (Additional Rehabilitations):** Construction of cost-effective / value-effective sewer rehabilitations and the performance of construction resident project representative services. Additional sewer rehabilitation work includes approximately: installing 3000 LF of 8 to 10-inch diameter CIP pipe; installing short liners at six (6) locations (within 8 to 21-inch diameter pipe); and rehabilitating 13 manholes; (Estimated Additional Rehabilitations Construction Cost = \$130,000).

The above work will be performed pursuant to the terms and conditions detailed within the August 24, 2018 Agreement For Engineering Services By and Between the Town of Stoughton and Weston & Sampson Engineers, Inc. and the approved MWRA Phase 11 I/I Local Financial Assistance Project Application received May 2, 2019. Total project cost is estimated at \$130,000 (Construction = \$130,000). Eligible MWRA I/I Local Financial Assistance is \$130,000. As a result of the above work, an estimated 0.10 mgd of peak I/I will be removed from the collection system upon contract completion.

**PROJECT SCHEDULE**

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
<u>Years 3 / 4 / 5 I/I Rehabilitation</u>		
Design / Design Review	November 2017	March 2018
Advertise	April 2018	April 2018
Bid Opening	April 2018	April 2018
Contract Award	June 2018	June 2018
Rehabilitation Construction	August 2018	February 2019
Warranty Retesting	September 2019	October 2019

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**MWRA PROJECT NO. WRA-P11-35-3-1106**

**CITY OF WALTHAM  
SEWER AREA 13 / 14B SEWER AND MANHOLE REHABILITATION**

**SCOPE OF SERVICES**

The purpose of this project is to reduce I/I through rehabilitating manholes and sewer pipes in specific community sewer areas. This is the first phase of a multi-phased sewer rehabilitation project for the City's Sewer Area 13 / 14B. Project work will include, but not be limited to, the following:

Installing 50 LF of 6-inch PVC sanitary sewer pipe; 4300 LF of 8-inch PVC sanitary sewer pipe; 75 LF of 10-inch PVC sanitary sewer pipe; 450 LF of 24-inch PVC sanitary sewer pipe; 2750 LF of sanitary sewer service connections (all diameters); 450 VF of 4-foot diameter manhole for sewer or drain; 50 VF of 5-foot diameter manhole for sewer or drain; 75 VF of inside manhole drop connections; 100 VF sewer or drain structure rebuild or remodel; (10) catch basins – replacing frame and grate; (10) catch basins – replacing curb inlet, frame and grate; (1) temporary sewer bypass pump; (5) sealing manhole frames; (10) manholes – point repair of chimney; (8) manholes – point repair of wall; (5) manholes – point repair of bench; (10) manholes – replace frame and cover; (6) manhole – remove cross bore; (5) manholes – clean; 50 VF lining manholes; 100 VF grouting manholes; (5) root removals from manholes; (30) sanitary sewer pipe – root removals (per joint); (5) sanitary sewer pipe – point repair replace 5' to 10'; (5) sanitary sewer pipe – cut intruding lateral; 1250 LF lining sanitary sewer pipe (less than 18" diameter); 600 LF lining sanitary sewer pipe (18" diameter and greater); (80) reinstatement of sewer services after lining; (5) grouting sanitary sewer pipe; (5) inspection of manholes; 1500 LF CCTV inspection of sanitary sewer pipes (all diameters); 600 LF of heavy cleaning of pipe; and the performance of all other work pursuant to the terms and conditions detailed within the plans and specifications for the City of Waltham Area 13 / 14B Sewer and Manhole Rehabilitation and the approved MWRA Phase 11 I/I Local Financial Assistance Project Application received April 1, 2019.

Project work area includes: Andrea Road, Auburn Street, Bedford Street, Boynton Street, Cabot Street, Eddy Street, Everett Street, Pearl Street, South Street, Vernon Street, Weston Street, Winthrop Street, and various easements.

Overall project cost is estimated at \$4,600,000. Eligible MWRA I/I Local Financial Assistance is \$3,849,500. As a result of the above sanitary system rehabilitation work, an estimated 0.18 MGD of peak I/I will be removed from the collection system upon contract completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**MWRA PROJECT NO. WRA-P11-35-3-1106**

**CITY OF WALTHAM  
SEWER AREA 13 / 14B SEWER AND MANHOLE REHABILITATION**

**PROJECT SCHEDULE**

<u>Description of Work</u>	<u>Start Date</u>	<u>Completion Date</u>
Project Bid & Award	February 2019	May 2019
Rehabilitation Construction	June 2019	April 2020

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 11  
ATTACHMENT A  
FINANCIAL ASSISTANCE AGREEMENT**

**PROJECT NO. WRA-P11-40-3-1118**

**TOWN OF WILMINGTON**

**CONSTRUCTION OF SEWER AND MANHOLE REHABILITATION (Sub Area 5 and 8)**

**SCOPE OF SERVICES**

The purpose of this project is to reduce I/I through rehabilitating manholes and sewer pipes in specific community sewer areas. The project is part of an ongoing I/I program. The Work is based primarily on findings from the 2017-2018 Town-wide Infiltration/Inflow Analysis (construction project). This project is part of a multi-phased sewer rehabilitation project for the Town and will include, but not be limited to, the following:

Replacement of two pipe segments (640 LF) on Woburn Street; installing 9,740 LF of trenchless CIPPL and associated work; performing 5 cured-in-place spot repairs (CIPSR); testing and sealing 76 services; installing 5 lateral connection liners (LCL); rehabilitating 42 manholes, including cementitious or epoxy lining, grout injection, chimney seals, repairs/replacement of frame and covers, or manhole replacement. The construction will include the performance of all other work pursuant to the terms and conditions detailed within the project's plans and specifications and the MWRA Phase 11 I/I Local Financial Assistance Project Application received April 23, 2019.

Total project cost is estimated at \$950,000. Eligible MWRA I/I Local Financial Assistance is \$428,000 (Phase 9). Estimated I/I removal will be determined upon contract completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM – PHASE 11  
ATTACHMENT B  
FINANCIAL ASSISTANCE AGREEMENT**

**PROJECT NO. WRA-P11-40-3-1118**

**TOWN OF WILMINGTON**

**CONSTRUCTION OF SEWER AND MANHOLE REHABILITATION (Sub Area 5 and 8)**

**PROJECT SCHEDULE**

<u>Description of Work</u>	<u>Start Date</u>	<u>Completion Date</u>
Design	April 2019	June 2019
Project Bid & Award	June 2019	August 2019
Rehabilitation Construction	September 2019	April 2020

ATTACHMENT 5  
TO  
MWRA ANNUAL I/I REDUCTION REPORT FOR FY19  
Reporting Period: July 2018 Through June 2019

**I/I REDUCTION STATUS UPDATE  
FOR MEMBER COMMUNITIES**

The MWRA is working cooperatively with member communities to develop phased I/I reduction programs throughout the service area. The Authority will encourage continuing community efforts in I/I reduction as detailed in the MWRA Regional I/I Reduction Plan. Many community I/I projects are funded through MWRA's I/I Local Financial Assistance Program. This \$760.75 million grant/loan program was established to provide funding to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned collection systems. Through FY19, MWRA has distributed \$401 million to fund local projects. A detailed update on MWRA's I/I Local Financial Assistance Program is included as Attachment 4 to this report.

The Authority has instituted a computer-based questionnaire format for communities to submit annual status reports on their I/I reduction programs. All 43-member sewer communities have submitted information to MWRA for FY19. Community information is summarized below:

**1. ARLINGTON: North System**

Background Information:

- Miles of Sewer: 106
- Sewered Population: 45,474
- Three Year (CY16 - CY18) Annual Average I/I: 2.21 mgd
- MassDEP Administrative Actions since 2010: ACOP-NE-10-1N006 (August, 2010)

Latest I/I or SSES Reports:

Area #8 Sewer System Investigation Report (August 2014)  
Area #9 Sewer System Investigation Report (August 2015)  
Area #10 Sewer System Investigation Report (August 2016)  
Phase #7 Sanitary Sewer Rehabilitation - Post Rehabilitation Flow Evaluation (July 2017)  
Area #11 Sewer System Investigation Report (August 2017)  
Phase #8 Sanitary Sewer Rehabilitation Report - Post Rehabilitation Flow Evaluation (July 2018)  
Area #8, 9, 10 & 11 Smoke Testing Report (January 2019)  
Phase 9 Sanitary Sewer Rehabilitation - Post Rehabilitation Flow Evaluation (July 2019)

Private Source Inflow Removal Program: The Arlington DPW is currently implementing a water meter replacement program. At the time of the water meter replacement, a building inspection is performed by the Town employee while they are still in the home. As of June 6, 2019, 7451 building inspections have been completed. The building inspections are ongoing and anticipated to be completed Town-Wide by December 2020.

I/I Rehabilitation Projects in Design or Construction:

The Phase #8 Sanitary Sewer Rehabilitations - Bid No. 16-26 was substantially complete in November 2016. Work completed: root treatment of 2711 LF of sewer; cleaned & inspected 844 LF of sewer; installed 8584 LF of CIPP lining; installed 116 LF of structural CIPP lining; reinstated & grouted one lateral liner; installed 8 LF of structural short liners; cementitious lining of 364 VF of manholes; grouted & patched 5 manholes; separated 5 shared manholes; installed 5 internal drop connections; installed an inflow dish; replaced 2 manhole frames and covers; open cut point repair at 4 locations; and installed 3 precast sewer manholes. The Warranty Inspection work for this project was completed in April 2017.



The Phase #9 Sanitary Sewer Rehabilitations - Bid No. 17-15 was substantially complete in September 2017. Work completed: root treatment of 1853 lf of sewer; installed 5902 lf of cured-in-place pipe (CIPP) lining; grouted 128 service connections in cured-in-place pipe; cut three (3) protruding service connections; cementitious lining of 247 vertical feet of manholes; grouted and patched five (5) manholes; installed four (4) internal drop connections; installed two (2) manhole inflow dishes; replaced one (1) frame and cover; open cut point repair at five (5) locations; and installed five (5) precast manholes. The Phase #9 Post Construction Flow Evaluation Report will be completed in Summer 2019.

The Phase #10 Sanitary Sewer Rehabilitations - Bid No. 18-32 was substantially completed in May 2019. Work completed: root treatment of 1989 lf of sewer; installed 8513 lf of cured-in-place pipe (CIPP) lining; grouted 129 service connections in cured-in-place pipe; tested and grouted seven (7) laterals; cleaned and inspected 155 linear feet of sanitary sewer; cut nine (9) protruding service connections; cementitious lining of 313 vertical feet of manholes; grouted and patched four (4) manholes; installed two (2) manhole inflow dishes; built two (2) manholes benches and inverts; raised two (2) manhole frames and covers to grade; replaced one (1) frame and cover; open cut point repair at three (3) locations; and installed four (4) precast manholes. The Warranty Inspections are expected to be completed by Spring 2020.

The Phase #11 Sanitary Sewer Rehabilitations - Bid No. 19-23 was opened on June 19, 2019. Details of this project are included in Attachment 4. The project is expected to be substantially complete by November 2019 with Warranty Inspections completed by November 2020. In May 2019, \$800,000 in MWRA I/I Local Financial Assistance was distributed for this project (MWRA Project No. WRA-P11-01-3-1117). The estimated peak infiltration removal for this project is 0.04 mgd.

Reporting Period Activity: The Town is continuing with the 12-year Sewer System Investigation and Planning Program which was initiated in September 2006.

The Area #8, 9, 10 & 11 Smoke Testing Report was completed in January 2019. The Area #11 Sewer System Investigation Report, which includes sewer investigations in Mini-Systems 16, 47, 51, O, P, U, X, AB, AC, AP, AQ, AR, OS & OT, was completed in July 2019. The Phase #10 Sanitary Sewer Rehabilitations - Bid No. 18-32 was opened on July 19, 2018. The project was substantially complete in November 2018 with Warranty Inspections to be complete by November 2019.

MWRA I/I Local Financial Assistance Program: The community has financed twenty-four (24) I/I reduction projects through the Authority's funding assistance program. Of the \$13,703,000 allotted through the Program's Phases 1 - 13, the community has \$4,480,000 remaining in funding assistance.

## **2. ASHLAND: South System**

Background Information:

- Miles of Sewer: 66
- Sewered Population: 13,549
- Three Year (CY16 - CY18) Annual Average I/I: 0.42 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: I/I Investigation: TV Inspection (2014 Summary Report): April 2015  
SSES Analysis of Flow Metering Data: May 2019  
I/I Investigation: TV Inspection (2017/8 Summary Report): Ongoing

Private Source Inflow Removal Program: Sump pump/roof leader investigations (via DPW personnel) by sub-basin during CY18/19:

Sub-Basin 1:	36 inspections	Sub-Basin 2:	54 inspections
Sub-Basin 3:	58 inspections	Sub-Basin 4:	44 inspections

I/I Rehabilitation Projects in Design or Construction: The Town has contracted Truax Corp. to perform internal TV inspection of 199,500 LF of sewer main in Ashland Sewer System Sub-Basins 1 / 2 (MWRA Project No. WRA-P8-02-1-827). The majority of the sewer main investigation work has been completed. A 2017/8 Investigations Summary Report is currently being prepared. The report will address sewer main rehabilitation options.

Reporting Period Activity: A Town-wide wastewater flow metering and I/I identification project (MWRA Project No. WRA-P9-02-1-957) began in March 2017. Flow Metering (20 meters) was performed 3/28/17 - 6/30/17. Metering / infiltration analysis / flow isolation and CCTV inspection work completed. Wastewater data analysis and report preparation completed May 2019.

The Town awarded a sewer repair contract to National Water Main and Cleaning Company. The following repair work was completed by NWM in June 2019: thirteen short liner spot repairs were installed within Town sewer mains.

The Town awarded a sewer repair contract to National Water Main and Cleaning Company. The following repair work was completed by NWM in the Fall 2017/Winter 2018: twelve sewer manhole covers adjusted and/or replaced; twelve sewer main segments repaired by joint testing and sealing; fifty-one sewer service connections tested with twenty sewer service connections sealed; and eleven sewer manholes repaired by leak seal and patch. The estimated peak I/I removed from these repairs was estimated to be approximately 90,600 gpd.

MWRA I/I Local Financial Assistance Program: The community has financed seven (8) I/I reduction projects through the Authority's funding assistance program. Of the \$3,818,500 allotted through the Program's Phases 1 - 13, the community has \$2,076,050 remaining in funding assistance.

### **3. BEDFORD: North System**

Background Information:

- Miles of Sewer: 78
- Sewered Population: 13,321
- Three Year (CY16 - CY18) Annual Average I/I: 1.21 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report:     Phase #3 Sewer System Investigation (October 2016)  
   Phase #4 Sewer System Investigation (October 2016)  
   Phase #5 Sewer System Investigation (May 2018)

Private Source Inflow Removal Program: Town-Wide private inflow source inspection is included with the ongoing water meter replacement project. The Town intends to check for improperly connected sump pumps at approximately 4000 sites, mostly residential properties.

I/I Rehabilitation Projects in Design or Construction: The Phase #5 Sewer System Evaluation and Survey Report was completed in May 2018. An estimated 65,952 gpd of infiltration and 68,743 gpd of inflow was identified.

Reporting Period Activity: The Phase #5 Sanitary Sewer Rehabilitation Project will be conducted in the summer of 2019. Line segments and manholes included in the Project contain an estimated 117,504 gpd of infiltration (58,752 gpd removable).

The Town-Wide Force Main Evaluation and Prioritization is ongoing. Phase II work will be completed in Summer/Fall 2019.

In May 2019, \$440,058 in grant/loan funds were distributed for the following project: Construction and Construction Services for Sewer and Manhole Rehabilitations (Phase #5) and Town-Wide Sump Pump Survey. Details of this project are included in Attachment 4 (MWRA Project No. WRA-P11-03-3-1115).

MWRA I/I Local Financial Assistance Program: The community has financed eight (8) I/I reduction projects through the Authority's funding assistance program. Of the \$5,654,600 allotted through the Program's Phases 1 - 13, the community has \$3,214,942 remaining in funding assistance.

## **4. BELMONT: North System**

### Background Information:

- Miles of Sewer: 78
- Sewered Population: 26,061
- Three Year (CY16 - CY18) Annual Average I/I: 1.47 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: Preliminary Design Report – Investigations of Sewers to Identify I/I Report (January 2013)

Private Source Inflow Removal Program: The Town has submitted applications for MWRA Local Financial Assistance: one project will include Private Sector Inflow removal - Sump Pump Disconnection & Relocations which includes removal of up to 90 sump pumps connected to the sewer system. This work is scheduled to begin in September 2019.

I/I Rehabilitation Projects in Design or Construction: The Town has submitted two funding applications for MWRA Local Financial Assistance for the August 2019 funding cycle covering the following projects:

- Mainline CIPP Lining Project: work includes 10,000 LF of sewer mainline lining;
- Manhole Cover Insert Inflow Study: work evaluates the effectiveness of inflow removal with manhole cover inserts with potential implementation town-wide.
- Private Sector Inflow Removal - Sump Pump Disconnection & Relocations: work includes removal of up to 90 sump pumps connected to the sewer system.

These three projects are scheduled to begin in September 2019.

Reporting Period Activity: The Town has continued with the comprehensive storm water sampling program, beginning in 2017. The sampling results have facilitated sewer and storm drain dyed-water testing and CCTV inspection to identify defects requiring repair. A total of 8 repairs (7 laterals lined and 1 CIPP Line segment) have been completed and several additional repairs are scheduled. Future repairs will continue as defects are identified.

MWRA I/I Local Financial Assistance Program: The community has financed five (5) I/I reduction projects through the Authority's funding assistance program. Of the \$8,255,100 allotted through the Program's Phases 1 - 13, the community will have \$5,263,000 remaining in funding assistance.

## **5. BOSTON: North and South Systems**

### Background Information:

- Miles of Sewer: 858
- Sewered Population: 645,320
- Three Year (CY16 - CY18) Annual Average I/I: 30.99 mgd
- MassDEP Administrative Actions: None (Cooperative Agreement Exists)

Boston North is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Boston North are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Reports: Roslindale SSES; Dorchester SSES; City-Wide I/I Analysis; West Roxbury Low Level Sewer I/I Study; Roxbury Canal Sewer Separation Study; Upper Neponset Valley Sewer Inflow Survey; Granite Avenue I/I Survey; Dorchester High Level Sewer I/I Survey; Lower Dorchester Brook Sewer Study; and Longwood Medical Area I/I Survey.

Private Source Inflow Removal Program: Since 1994, the Downspout Disconnection Program has conducted approximately 38,000 building surveys and 10,500 dye water tests. Approximately 25,192 downspouts have been disconnected. During CY05 - CY19, a total of seventy-five (75) large impervious areas were surveyed to identify inflow sources. All seventy-five (75) areas have been dye tested. During this reporting period, private inflow sources at Nos. 55 & 75 Morrissey Boulevard (Dorchester) have been removed.

I/I Rehabilitation Projects in Design or Construction: BWSC has both completed and is currently working on a wide variety of separation and I/I identification/rehabilitation projects. To date, eighty-two (82) projects have received funding through the MWRA I/I Local Financial Assistance Program. During FY07 - FY19, BWSC completed the following MWRA-financed rehabilitation projects: Dudley Square Sewer Separation; Fairfield Street Sewer Rehabilitation; Rehabilitation of Sewers in the Fenway (Audubon Circle / St. Mary's Street Area); A Street Area Sewer Separation (South Boston Gillette Headquarters); Mass Ave - Dorchester Separation (New Market Square Area); East Boston (Border/Meridian Street Area) Sewer Separation; Sewer Rehabilitation in Back Bay/Kenmore/Hyde Park/Mattapan; Albany Street Sewer Separation; Sewer Rehabilitation in Dorchester/Mattapan/West Roxbury/Brighton; Talbot Avenue High Level Sewer Area Sewer Replacement/Manhole Rehabilitation; South End Sewer Rehabilitation; Marginal Street Sewer Separation; St. Botolph Street Sewer Separation; Maverick Street Sewer Separation; West Side Interceptor and Public Garden Lining; Back Street Sewer Separation and Chester Park Area Sewer Separation.

On-going rehabilitation projects include: Upper Roxbury Area Sewer Separation Phase 2 (MWRA Project No. WRA-P9-05-3-969) and East Boston Sewer Separation Phase I (MWRA Project No. WRA-P9-05-3-988).

BWSC entered into an I/I reduction agreement with the Massachusetts DEP in January 1986. As provided in the agreement, BWSC has performed a Phase II SSES on separated sewer areas within the City. BWSC also has an ongoing tide gate/regulator inspection and repair program and performs separation projects on pockets of combined sewers tributary to separated sewer areas.

Reporting Period Activity: BWSC is required to report to the EPA on I/I reduction measures under their NPDES permit. This reporting requirement coincides with the MWRA's required submittal dates; therefore, please refer to the BWSC NPDES report for a summary of activities during this period.

MWRA I/I Local Financial Assistance Program: The Commission has financed eighty-two (82) I/I identification/reduction projects through the Authority's funding assistance program. Of the \$218,001,200 allotted through the Program's Phases 1 - 13, the Commission has \$123,888,424 remaining in funding assistance.

## **6. BRAINTREE: South System**

Background Information:

- Miles of Sewer: 140
- Sewered Population: 37,045
- Three Year (CY16 - CY18) Annual Average I/I: 3.79 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report:     Annual Town-Wide Sewer Program - Year 5 Investigation (January 2017)  
   Annual Flow Monitoring Project (April 2018)  
   Annual Town-Wide Sewer Program - Year 6 Investigation (January 2018)  
   Annual Town-Wide Sewer Program - Year 7 Investigation (January 2019)  
   Howard Street Pump Station Area Investigation (April 2019)  
   2018 Annual Wastewater Flow Monitoring (Ongoing)  
   Annual Town-Wide Sewer Program - Year 8 (Ongoing)

Private Source Inflow Removal Program: Sump pump removal program is ongoing. Ten (10) private source sump pump removal contracts have redirected 295 sump pumps to date. Developer Flow Reduction Program is now 6 to 1 per DEP ACO. During CY13/14, a sump pump amnesty letter was sent out with the Town's annual water report to all users. The letter resulted in 31 customer calls to have their connections checked. To date, 27 inspections have taken place and nine (9) sump pumps have been identified for removal. Actual removal/rerouting of the sump pumps has not yet taken place.

I/I Rehabilitation Projects in Design or Construction: Year 8 I/I Investigation (Study) work in Subareas E3 / K1 / L2 / L4 / W1 began March 2019 and was completed in June 2019. Summary Report to be completed January 2020 (MWRA Project No. WRA-P11-06-3-1104). Year 8 rehabilitation design to begin February 2020. Year 8 rehabilitation construction to be bid Summer 2020.

Year 7 I/I Investigation (Study) work in Subareas C3 / L6 / L7 / T1 began March 2018 and was completed in July 2018. Summary Report was completed January 2019 (MWRA Project No. WRA-P9-06-3-981). Year 7 rehabilitation design complete July 2019. Year 7 rehabilitation construction to be bid August 2019.

Year 6 I/I Investigation (Study) work in Subareas A2 / L3 / L5 began March 2017 and was completed in July 2017. Summary Report completed January 2018. Annual I/I Removal Program (Year 6) rehabilitation design (MWRA Project No. WRA-P9-06-3-961) completed August 2018. Year 6 Rehabilitation Construction began October 2018 and is now substantially complete. Warranty Inspection work to be performed in Fall 2019/Spring 2020. The Year 6 project removed an estimated 0.30 mgd of peak infiltration from the Town's sewer system.

Annual I/I Removal Program (Year 5) design (MWRA Project No. WRA-P9-06-3-941) was completed June 2017. Year 5 Rehabilitation Construction (Braintree Contract S17-1) began October 2017 with Warranty Retesting work completed Spring 2019. The Year 5 project removed an estimated 32,040 gpd of infiltration from the Town's sewer system.

Reporting Period Activity: Town-Wide Annual Wastewater Flow Monitoring began January 2018 and was complete December 2018. Approximately 22% of the Town's sewer system was directly monitored for this analysis. Summary Report to be complete Fall 2019 (MWRA Project No. WRA-P9-06-1-975). Howard Street Pump Station Tributary Area TV Inspection work in Subareas HC1 / HC2 / HC3 began January 2019 and was complete March 2019. Summary Report completed April 2019 (MWRA Project No. WRA-P9-06-3-961). Approximately 100,080 gpd of peak infiltration was observed during television inspection. Recommended rehabilitations for this area were incorporated into the above Year 7 rehabilitation construction project.

MWRA I/I Local Financial Assistance Program: The community has financed thirteen (13) I/I reduction projects through the Authority's funding assistance program. Of the \$14,419,000 allotted through the Program's Phases 1 - 13, the community has \$6,060,000 remaining in funding assistance.

## **7. BROOKLINE: North and South Systems**

Background Information:

- Miles of Sewer: 111
- Sewered Population: 58,565
- Three Year (CY16 - CY18) Annual Average I/I: 3.84 mgd
- Mass DEP Administrative Actions: None

Brookline is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Brookline are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Report:

Sewer Evaluation Survey in Subareas NI-7, 8 & 12 Final Report (May 2012)  
Results for Condition Survey - Subareas NI-7, NI-8 & NI-12 Technical Memo (August 2012)  
Eliot Street Smoke Testing Technical Memo (January 2013)  
Englewood Ave/Kilsyth Road Sewer Alternative Evaluation Technical Memo (February 2013)  
Wastewater Master Plan Update (December 2013)  
Results for Sewer Condition Survey in Subareas NI-9, NI-10 & NI-11 Technical Memo (September 2014)

Private Source Inflow Removal Program: Town is in the process of developing a Private Flow Source Identification and Removal Program. A 4:1 Flow Reduction is enforced for large residential and commercial projects. The community is continuing its public outreach for private inflow identification/removal. Engineering Division personnel are on the lookout for illicit sump pumps during inspections.

The Town has completed its contract (PW/15-10) and has determined a few sewer services may have sump pumps connected to their sewer. The Town is working on the exact policy for removal private inflow sources in our sewer use regulations that still needs Town meeting approval. The Town's long term plan is to CIPP all the public sewer mains and epoxy line all public SMH's in the Town. After the Town has completely rehabilitated its sewer system in a particular basin, the Town will then address suspected private inflow sources sewer basin-to-basin.

I/I Rehabilitation Projects in Design or Construction: In January of 2019 the Town executed contract PW/18-22, Sewer System Rehabilitation with Green Mountain Pipeline Services, in the amount \$1,485,700. This project is funded using only Town funds. The contract involves the CIPP lining of 41,800 LF of 8 inch to 24 inch sanitary sewers, 6000 LF of heavy cleaning, and 6400 LF of CCTV. The majority of the CIPP work is in sub areas NI-5 and NI-9 that have been identified by MWRA sewer meter study as high inflow areas. At the completion of the project all Town owned sewer mains in NI-5 and NI-9 will have been CIPP rehabilitated. The contract is about 95% constructed.

In June of 2019 the Town executed contract PW/19-10, Epoxy Lining of Sewer Manholes, in the amount of \$1,243,350 with National Water Main Cleaning Company. This project is also being funded using only Town funds. This project will epoxy line approximately 267 sewer manholes and replace about 25 defective SMH frames and covers.

In March of 2019, the Town hired D'Allessandro Corp. to construct a 20 LF of 8-inch sanitary sewer emergency repair on Stearns Road. The Town CIPP lined the repair after the repair was completed.

Reporting Period Activity: See Above information in Private Inflow Removal Program and I/I Rehabilitation Projects in Design or Construction paragraphs.

MWRA I/I Local Financial Assistance Program: The community has financed eight (8) I/I reduction projects through the Authority's funding assistance program. Of the \$21,355,200 allotted through the Program's Phases 1 - 13, the community has \$13,689,000 remaining in funding assistance.

## **8. BURLINGTON: North System**

Background Information:

- Miles of Sewer: 115
- Sewered Population: 26,605
- Three Year (CY16 - CY18) Annual Average I/I: 1.48 mgd
- MassDEP Administrative Actions since 2010: ACO-NE-15-1N001 (October 2015)

Latest I/I or SSES Reports:

- Project 7 - Evaluation of Localized Flooding Areas Final Report (February 2014)
- Project 7 - Building Inspections Final Report (March 2014)
- Project 7 - Sewer System Evaluation Survey Final Report (March 2014)
- Evaluation of Sewer Flows Based On SCADA Pump Station Data & Water Use Data - Project 7 (December 2014)
- Project 8 Sewer System Evaluation Survey (January 2019)
- Project 9 SSES (Ongoing)

Private Source Inflow Removal Program: No house-to-house inspection investigations were conducted over the last year. Twenty-seven (27) properties totaling thirty-four (34) illicit sewer connections were redirected from the Town's sewer system. The Town's sewer connection fund balance (5 for 1 sewer connection fee), excluding encumbrances, is \$1,072,243.

I/I Rehabilitation Projects in Design or Construction: Construction of Sewer Rehabilitations Downstream of Terrace Hall Force Main Discharge project was substantially completed September 26, 2017. Warranty retest work was complete spring 2018. Construction of Project 6 and 7 Sewer Rehabilitations was substantially completed August 14, 2017. Warranty retesting work was complete summer 2018. Construction of Lucaya Circle Pump Station and Force Main Rehabilitations was substantially completed April 12, 2017. The final pay estimate was processed in spring 2018. Weston & Sampson conducted Project 8 SSES investigations over the Summer/Fall 2018 and identified 38,788 gpd of removable infiltration. Weston & Sampson began Project 9 SSES investigations in Spring of 2019 and work is ongoing. The expected completion date is Fall 2019. Project 8 & 9 rehabilitations is tentatively scheduled for 2020.

Reporting Period Activity: See above information in Private Inflow Removal Program and I/I Rehabilitation Projects in Design or Construction paragraphs.

In June 2019, \$1,110,000 in MWRA grant/loan funds was distributed for the design and construction of sanitary sewer rehabilitations in Project 8 & 9 Areas and an SSES in Project 9 & 10 Areas. These projects are a component of Burlington's Capital Improvement Program and part of a multi-phased sewer rehabilitation program. Details of these projects are included in Attachment 4 (MWRA Project No. WRA-P11-08-3-1119).

MWRA I/I Local Financial Assistance Program: The community has financed thirteen (13) I/I reduction projects through the Authority's funding assistance program. Of the \$8,432,000 allotted through the Program's Phases 1 - 13, the community has \$2,220,000 remaining in funding assistance.

## 9. CAMBRIDGE: North System

### Background Information:

- Miles of Sewer: 148
- Sewered Population: 107,278
- Three Year (CY16 - CY18) Annual Average I/I: 5.52 mgd
- Mass DEP Administrative Actions since 2010: None

Cambridge is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Cambridge are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Reports:   Area 4 Infrastructure Improvements and Kendall Square Sewer Assessment (July 2015)  
Kendall Square Area Green Infrastructure Stability Results (March 2016)  
DEP Report on Cambridge I/I Management Program (December 2017)  
East Cambridge and Cambridgeport I/I Gray Infrastructure Mitigation Alternatives (March 2016)  
Ten Year Sewer and Drain Infrastructure Plan (April 2019)  
I/I Database Development (Ongoing)

Private Source Inflow Removal Program: The City has completed house-to-house inspections in the Willard Street catchment area. This work was done as part of the design of a new stormwater outfall to the Charles River. Construction of the stormwater outfall is ongoing.

The City completed (2018) an IDDE project in the Cambridgeport catchment area including cleaning and inspection of the drainage system, building inspections, dye testing and sampling. This project was performed in advance of the construction of a new stormwater outfall at Talbot Street. Three illicit connections were identified. As of June 2019, illicit connections were removed at 201 Vassar Street and 744 Massachusetts Avenue. An illicit connection at 57 Magazine Street will be removed by Fall 2019. Once removed, a round of dry weather sampling will be conducted to clear the remaining area downstream of illicit connection and the overall catchment.

The City continues to work with developers on I/I removal projects triggered by increased sewer flows greater than 15,000 gpd on new development projects. I/I removal projects are currently in progress for developments at: Cambridge Crossing (North Point Development), 203 Concord Turnpike, 50 Cambridge Park Drive, 55 Wheeler Street, 325 Main Street, 135 Broadway and the Cambridge Redefinition.

### I/I Rehabilitation Projects in Design or Construction:

- Talbot Street storm drain and outfall: estimated completion January 2020
- Willard Street sewer separation and re-establishment of the stormwater outfall: work at 75% design
- Binney Street Sewer Separation (Contract 9a&b by Divco): estimated completion September 2019
- Monsignor O'Brien (MOB) Phase 1 sewer separation on MOB: estimated completion October 2019
- Monsignor O'Brien (MOB) Phase 2a (Lechmere Canal Outfall): estimated completion July 2020
- Parking Lot 6 (PL6) Stormwater Storage Tank Installation: estimated completion Fall 2020
- I/I investigations in Erie & Endicott systems: completed September 2018
- Cottage/Lopez sewer separation: estimated completion Spring 2020
- First Street Sewer Separation (Boston Properties): completed June 2019
- Cambridge Crossing received an MWRA permit for a direct connection to the Cambridge Branch Sewer at Medford Street in Somerville. 1200 LF of force main and 800 LF of gravity sewer has been installed.
- Cambridge Crossing Sewer Separation (Gore Street by Divco): estimated completion 2020
- Broadway Drain Line Extension/Enlargement (Main St I/I project for Boston Properties): estimated completion April 2021
- Broad Canal Way Storm Drain Pipe Enlargement (Phase 1): completed 2018
- Land Boulevard Sewer Separation (Cambridgeside): estimated completion 2022
- North Mass Ave Residential Side Street Infiltration Program: ongoing by various developers

Reporting Period Activity: In 2019, the City CCTV'd approximately 20,800 LF of sewer main. Also, the City's Remedial Repair Contractor made various repairs to the City's sewer and drain system at 230 locations. These repairs consisted primarily of spot repairs on mainline pipes, replacing manhole frames and covers and replacement of catch basins. Replacement of a sewer main on Wadsworth Street (from Amherst Street to Main Street) and decommissioning of the Main Street Pump Station was also performed. In November 2017 and March 2019, MWRA I/I Local Financial Assistance was distributed for the construction of the Port Infrastructure Improvement Project: Parking Lot No. 6 Stormwater Storage Tank and Combined Sewer Flow Reduction Project (MWRA Project Nos. WRA-P9-09-3-976 / 1105).

MWRA I/I Local Financial Assistance Program: The community has financed eleven (11) I/I reduction projects through the Authority's funding assistance program. Of the \$39,250,100 allotted through the Program's Phases 1 - 13, the community has \$10,420,000 remaining in funding assistance.

## **10. CANTON: South System**

Background Information:

- Miles of Sewer: 62
- Sewered Population: 16,603
- Three Year (CY16 - CY18) Annual Average I/I: 1.61 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: I/I Five Year Management Plan Update (December 2014)  
I/I Management Plan (MassDEP) (June 2018)

Private Source Inflow Removal Program: No additional inspections were reported during this period. Town has established an I/I Mitigation Fee for all new connections. Fee is paid based upon DEP flow rates at a 4 to 1 ratio.

I/I Rehabilitation Projects in Design or Construction: Sewer System Rehabilitation (Canton Contract No. 12-01S / MWRA Project No. WRA-P8-10-3-817) was performed within Sewer Subsections 1-12 / 17 and included sewer manhole sealing/restoration, sewer pipe testing and sealing, CIPP lining and joint testing/sealing. Project work is complete.

Reporting Period Activity: Town performed television inspection within 30,000 LF of sewer main as part of I/I Management Plan. The Town replaced 250 LF of broken 8-inch VC sewer main on Washington Street (at Walnut Street). The Town also conducted a 12-week flow metering program within Subsystems 7/9/12/14/16/18/19/24 to identify areas with extraneous flows.

MWRA I/I Local Financial Assistance Program: The community has financed six (6) I/I reduction projects through the Authority's funding assistance program. Of the \$6,635,900 allotted through the Program's Phases 1 - 13, the community has \$3,960,000 remaining in funding assistance.

## **11. CHELSEA: North System**

Background Information:

- Miles of Sewer: 41
- Sewered Population: 40,227
- Three Year (CY16 - CY18) Annual Average I/I: 2.16 mgd
- MassDEP Administrative Actions since 2010: NON #00004520 – May 10, 2018 Failed to submit I/I Analysis due 12/31/17
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-008 (March 2009)

Chelsea is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Chelsea are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Report: Investigation into Excessive Infiltration/Inflow & Exfiltration (November 2009)  
Everett, Spruce & Second St Sewer & Drain Evaluation (October 2012)



Private Source Inflow Removal Program: The City began collecting Sewer Bank fees for redevelopment projects in CY13. The City has also begun a move toward the implementation of Green vs. Gray infrastructure to reduce the amount of stormwater discharged to combined sewers. Efforts to date have included requiring all redevelopment projects to utilize Low Impact Development and retain/infiltrate stormwater onsite, and incorporating green infrastructure into municipal projects (e.g., rain garden at Mace Housing Complex).

#### I/I Rehabilitation Projects in Design or Construction:

- The Shurtleff Street Utility Improvement Project was complete in December 2017.
- Construction of the 2015 Pump Station upgrades was complete in May 2018.
- Construction of the Carter Street Drainage Pump Station Force Main Relocation Project was complete in June 2018.
- Construction of the Clark Avenue, Crescent Avenue, Tudor Street, and Lawrence Street Utility and Roadway Improvements Project was complete in Fall 2017.
- Construction of the Phase V Gateway Center Infrastructure Improvements Project is scheduled to finish utilities in July 2019.
- Construction of the Maverick Street Road and Utility Improvements was completed June 2019.
- Construction of the Essex Street & Highland Street Utility Improvements project began in July 2019 and is anticipated to be complete in 2020.
- Design of utility and road improvements for Beacham Street is ongoing. This project includes comprehensive sewer and drain reconstruction, including sewer separation. Construction scheduled to begin 2020-2021.
- Design of utility and road improvement for Upper Broadway are ongoing. Construction scheduled to begin 2020-2022.
- A total of 18 point repairs were completed for the sewer and drain system during the last year. Cleaning of approximately 21,300 LF of sewer and drain was completed during the last year.

Reporting Period Activity: See list above.

MWRA I/I Local Financial Assistance Program: The community has financed thirteen (13) I/I reduction projects through the Authority's funding assistance program. Of the \$11,760,100 allotted through the Program's Phases 1 - 13, the community has \$6,209,000 remaining in funding assistance.

## 12. DEDHAM: South System

#### Background Information:

- Miles of Sewer: 95
- Sewered Population: 24,502
- Three Year (CY16 - CY18) Annual Average I/I: 1.90 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: 2013 Year One Inflow Investigation (March 2014)  
2014 Smoke Testing Program (March 2015)  
Town-Wide Flow Monitoring (November 2016)  
Sewer System Hydraulic Flow Model Update (March 2017)  
Sewer Manhole Investigation (October 2018)

Private Source Inflow Removal Program: The Town adopted a sewer system enterprise fund at the May 2009 Town Meeting. A Municipal Buildings Inspection Program was undertaken to identify inflow sources. Inspections identified approximately 78,231 gpd of peak inflow. The Town removed the 78,231 gpd of peak inflow during CY15-19. The Town is also in the early stages of developing a private inflow removal policy.

Smoke testing was conducted within approximately 140,000 LF of sewer to identify potential inflow sources. Testing results indicated 27 inflow sources contributing approximately 78,231 gpd of peak design storm inflow. Of the 27 defects identified, six were located within the Town's ROW. These six defects were rehabilitated by the Town's DPW during CY14-CY19.

A Private Building Inspection was conducted within three of the Town's seven precincts. This program was promoted throughout the community as voluntary. The Town provided penalty amnesty to all residents/commercial property owners who participated. There were 3581 locations within the three precincts. Only 1510 property owners (42%) permitted inspections. Of the 1510 inspections performed, fifty-seven (57) direct and one (1) indirect inflow sources were observed (contributing 418,951 gpd of estimated peak inflow). These sources consisted of thirty-seven (37) sump pumps, one (1) floor drain, nine (9) interior open

cleanouts, four (4) exterior open cleanouts, five (5) direct driveway drains, one (1) indirect driveway drain and one (1) roof leader. Due to low program participation, the Town is not going to perform private building inspections within the remaining four (4) precincts at this time. The Town is currently working on how best to revamp the program for better participation and reviewing the collected data for removal alternatives for the sources identified.

**I/I Rehabilitation Projects in Design or Construction:** The Town, as part of the 2018 Sewer Rehabilitation On-Call Services Project, completed the installation of 9900 LF of CIPP lining, 36 LF of short liners, four (4) full wrap lateral liners and 379 VF of manhole exterior grouting and interior cementitious lining. The project was estimated to have removed approximately 180,000 gallons per day of infiltration.

The community also continued its annual sewer system inspection program. In March 2018, the Town began cleaning and television inspecting 135,000 LF of sewer main and performing top-side inspection of approximately 725 sewer manholes. The Town plans to utilize this data, along with previous year's backlog work, to perform CY19/20 rehabilitation on the most cost-effective sewer lines/ manholes utilizing an on-call rehabilitation contract.

**Reporting Period Activity:** Approximately 70 LF of sewer main extensions were installed throughout the Town by private developers. Upon completion of the extension projects, the Town took over ownership of the sewer mains.

**MWRA I/I Local Financial Assistance Program:** The community has financed sixteen (16) I/I reduction projects through the Authority's funding assistance program. Of the \$9,220,000 allotted through the Program's Phases 1 - 13, the community has \$3,480,000 remaining in funding assistance.

### **13. EVERETT: North System**

#### **Background Information:**

- Miles of Sewer: 57
- Sewered Population: 44,749
- Three Year (CY16 - CY18) Annual Average I/I: 2.24 mgd
- MassDEP Administrative Actions since 2010: None
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-026 (August 2009)

#### **Latest I/I or SSES Report:**

I/I Investigation (August - September 2013)  
IDDE Citywide Report (February 2015)  
Sewer Flow Monitoring Report (October 2016)  
EPA Administrative Order Compliance Report (January 2017)  
Lower Broadway I/I Investigation (November 2018)  
2018 Sewer I/I Investigation (December 2018)

**Private Source Inflow Removal Program:** Sewer smoke testing was completed in the Lower Broadway area as part of the I/I investigation. A building on Ashland Street was identified as having two downspouts directly connected to the MWRA interceptor. Three private catch basins and downspouts were disconnected at 9 Plymouth Street (883,000 gpd estimated peak inflow).

**I/I Rehabilitation Projects in Design or Construction:** The Otis, Henderson & Bow Streets Sewer Replacement Project was completed. The current phase of the catch basin redirection project was completed in Fall 2018. Sewer rehabilitation design as identified in the 2018 I/I investigation reports is scheduled to begin Summer 2019.

**Reporting Period Activity:** The Draft Report for the Sewer System Metering Project has been completed.

Mitigation projects for the Encore Casino site include drainage improvements in the Lower Broadway neighborhood including Route 99 - Broadway, Dexter Street and Robin Street. Improvements include disconnections and installation of deep sump catch basins.

The Rivergreen Subdivision (permitted in the late 1990's) was recently built-out to support relocated commercial properties from the Lower Broadway neighborhood. Improvements include deep sump catch basins and stormwater detention ponds.

Sewer and Drain Ordinance was adopted in fall 2018, The City has begun collecting fees.

The City has already collected \$78,400 from the Encore Casino developer for the Lower Broadway I/I investigation and is finalizing negotiation of approximately \$1.6M for I/I design and construction and is self-performing disconnection of three catch basins and two downspouts on Ashland Street (1.4 mgd estimated peak I/I).

MWRA I/I Local Financial Assistance Program: The community has financed nine (9) I/I reduction projects through the Authority's funding assistance program. Of the \$13,381,500 allotted through the Program's Phases 1 - 13, the community has \$6,731,000 remaining in funding assistance.

## **14. FRAMINGHAM: South System**

Background Information:

- Miles of Sewer: 275
- Sewered Population: 69,216
- Three Year (CY16 - CY18) Annual Average I/I: 2.51 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: Citywide I/I Study / SSES Phase 1 / CWMP (Complete)  
SSES Phase 2 (Complete); SSES Phase III (Complete)  
SSES Phase IV / V (Complete); Blackberry Lane SSES (Complete)

Private Source Inflow Removal Program: The City's ten-year capital plan now includes three phases of inflow removal projects. The first phase was financed in the FY17 budget cycle. The City is currently developing capital projects that will incorporate the removal of the illicit connections identified during the field reconnaissance efforts of the SSES programs. The capital project program will include the redirection of illicit flows as well as the extension of storm drain systems to remove flow from the sewer system. During this year's capital project development cycle, the City will determine the proposed rehabilitation areas and improvements required in order to further refine the costs and timing of the actual inflow removal projects. The City has begun drafting the scope of work for this first phase of projects.

The City has submitted an updated inflow removal scope of work and schedule to MassDEP for their review and approval. The plan includes working with City government to develop and initiate a program for sump pump and other inflow source (i.e., roof and area drains) removal. This work will be included as part of the FY20 capital budget request for the City's Phase 6 SSES project. The Phase 6 SSES FY20 appropriation was approved by the City Council in June 2019. As noted last year, the City has an ongoing phased pipeline and manhole rehabilitation design and construction program addressing high priority defects identified in previous SSES investigations. Phase 1 is complete and Phase 2 is ongoing. Phase 3 FY20 appropriation has been put on hold by the City Council pending further review and discussion and will be acted upon in Fall 2019.

The City conducted dye testing of roof leaders on three condominium buildings located at 1321-1325 Worcester Road and found them to be directly connected into the sanitary system. The roof's overall surface area is 43,125 sf. Inflow volume generated from these sources (from a one year, six hour design storm) is approximately 42,000 gpd.

I/I Rehabilitation Projects in Design or Construction: The Worcester Road Wastewater Infrastructure Improvements Project: Phase I - Eastbound (Contract PW-402 / MWRA Project No. WRA-P11-14-3-1112) is ongoing. Project work includes contracted wastewater infrastructure replacement along Worcester Road in the City of Framingham. Phase I work is located along the eastbound side of Worcester Road (Concord Street to Natick Town Line) and includes residential work along Pierce Street and Dinsmore Avenue. Eligible work to be performed includes: installation of 600 LF of 8-inch PVC and DI gravity sewer piping; installation of 930 LF of 10-inch PVC gravity sewer piping; installation of 710 LF of 12-inch PVC gravity sewer piping; installation of 6-inch PVC gravity sewer piping for sewer service connections; installation of 12 sewer manholes; and cleaning and TV inspection of 5820 LF of storm drain. Project work is ongoing.

The Sewer Defects Repairs (Phase 2) Project (Contracts PW-375 & 379 / MWRA Project No. WRA-P11-14-3-1102) Project is ongoing. Project work includes contracted sewer main/manhole rehabilitation and replacement throughout the City of Framingham. Phase 1 repairs (implemented in late 2017) corrected defects at and south of Waverly Street. Phase 2 addresses repairs between

Worcester Road (Route 9) and Waverly Street to the southerly City limits and in the vicinity of Concord Street to the City limits in East Framingham. Work to be performed includes: cleaning and television inspection of 55,000 LF of sewer main; root treatment of 3000 LF of sewer main; testing and sealing of 140 sewer main joints; CIPP spot repairs within 150 LF of sewer main; CIP lining of 15,150 LF of sewer main; lining 90 LF of sewer service connections; lining 1140 VF of sewer manholes; performing 50 spot sewer manhole repairs; rebuilding 10 sewer manhole inverts; and flow isolating 6175 LF of sewer main.

The Union Avenue Area Sewer Improvements (Contract 2) Evergreen Street Sewer Rehabilitation Project (Contract PW-369 / MWRA Project No. WRA-P11-14-3-1101) is ongoing. Project work includes contracted sewer main/manhole rehabilitation and replacement in the Union Avenue area of the City of Framingham. Work to be performed includes: replacement of approximately 1550 LF of 8-inch VC sewer main; replacement of approximately 375 LF of sewer service laterals; CIP lining of approximately 475 LF of 8-inch VC sewer main; and replacement of approximately 11 sewer manholes. The project's work area includes: Evergreen Street / Learned Street / Myrtle Street / Thurber Street / Lincoln Street.

The Union Avenue Area Sewer Improvements Phase 1 Project (Framingham Contract PW 320 / MWRA Project No. WRA-P9-14-3-953) was completed September 2018. Project work included the replacement of 950 LF of 8-inch sewer main; replacement of 1520 LF of sewer service laterals; CIP lining of 1700 LF of 8-inch sewer main; CIP lining of 120 LF of 15-inch sewer main and the replacement of 24 sewer manholes. The project's work area included: Union Avenue / Walnut Street / Neville Road.

Reporting Period Activity: The Lanewood Siphon Replacement was completed (275 LF of sewer replaced). Within Marble Street, 185 LF of sewer was replaced. The City also completed sewer realignment projects within the Shawmut Hancock Pump Station area (476 LF of sewer replaced) and Indian Head Road area (775 LF of sewer CIP lined).

City Operations staff performed 3985 LF of 6 to 12-inch sewer main replacements at 10 locations. City Operations staff / on-call service providers installed 16,569 LF of CIPP and rehabilitated 118 sewer manholes.

MWRA I/I Local Financial Assistance Program: The community has financed sixteen (16) I/I reduction projects through the Authority's funding assistance program. Of the \$20,375,000 allotted through the Program's Phases 1 - 13, the community has \$10,300,000 remaining in funding assistance.

## **15. HINGHAM: South System**

### **Background Information:**

- Miles of Sewer: 33
- Sewered Population: 7,363
- Three Year (CY16 - CY18) Annual Average I/I: 0.83 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: 2015 Town-Wide Flow Metering (February 2015)  
FY16 Evaluation (December 2015)  
FY17 Evaluation Year 1 (December 2017)  
2017 Inflow Investigations (December 2017)  
FY18 Evaluation Year 2 (December 2018)  
FY19 Evaluation Year 3 (Ongoing)

Private Source Inflow Removal Program: The house-to-house sump pump inspection and roof leader disconnection programs are ongoing. Through CY17-19, approximately 500 homes were inspected for sump pumps. One sump pump was identified as being connected to the sanitary system. This sump pump has been removed.

I/I Rehabilitation Projects in Design or Construction: FY17 I/I Investigation & Rehabilitation Program: Sewer cleaning and Inspection including TV inspection of approximately 41,400 LF of sewers. Review TV inspection videos of approximately 35,000 LF of sewer main. Conduct topside physical survey of 240 sewer manholes. Trenchless sewer repairs including 2971 LF of sewer testing and sealing; 1786 LF of structural CIP pipe; short liners at five (5) locations; CIP lateral liners at five (5) locations; ten (10) manhole rehabilitations; and furnish/install 19 manhole inflow dishes. Sewer dig repairs including five (5) open cut point repairs. Thaxter Street & Lincoln Street Manhole Frame and Cover Replacement. Broad Cove Force Main (Lincoln Street) Spot Repair. Work completed Summer 2019 (MWRA Project No. WRA-P9-15-3-994).

FY16/17 Annual Sewer Program: Review TV inspection videos of approximately 27,000 LF of sewer main. Conduct topside physical survey of 174 sewer manholes. Identified sewer main/manhole defects to be repaired as part of On-Call I/I Rehabilitation Services Contract. FY16/17 Smoke Testing (150,000 LF) and Rehabilitation Construction (MWRA Project No. WRA-P9-15-3-934) work completed Summer 2018.

Reporting Period Activity: A 6 to 1 [at \$2.67/gallon] fee for new system flow has been implemented. The generated funds are earmarked for I/I identification and repair. Ship Street and Street Sewer Extensions are complete (total length of extension is approximately 1800 LF of PVC sewer pipe). Greenbush Pump Station sump pump rehabilitation completed Summer 2018.

MWRA I/I Local Financial Assistance Program: The community has financed eight (8) I/I reduction projects through the Authority's funding assistance program. Of the \$2,802,500 allotted through the Program's Phases 1 - 13, the community has \$780,000 remaining in funding assistance.

## **16. HOLBROOK: South System**

Background Information:

- Miles of Sewer: 31
- Sewered Population: 9,923
- Three Year (CY16 - CY18) Annual Average I/I: 0.40 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: CWSRF No. 2919 Contract No. 1 (October 2009)

Private Source Inflow Removal Program: House-to-House inspections continue. All new home construction is inspected by the DPW and Town Plumbing Inspector. The State has approved the Town's Sewer Bank Policy.

I/I Rehabilitation Projects in Design or Construction: TV inspection was conducted on 10,500 LF of sewer in Sub-areas H(7) and H(8). Manholes inspections (300 total) were conducted primarily in Sub-areas A/F/G/H(8).

Reporting Period Activity: The Town has completed its yearly check of all cross-country sewer manholes. Plymouth Street System Extension has been completed. Abington Avenue sewer work has also been completed. Phase 3/4 properties associated with collection system expansion are now being connected at owner's request. Phase 5 System Extension (Spring Street Area) and Spring Street Pump Station work is complete.

MWRA I/I Local Financial Assistance Program: The community has financed two (2) I/I reduction projects through the Authority's funding assistance program. Of the \$2,779,600 allotted through the Program's Phases 1 - 13, the community has \$1,883,038 remaining in funding assistance.

## **17. LEXINGTON: North System**

Background Information:

- Miles of Sewer: 170
- Sewered Population: 33,120
- Three Year (CY16 - CY18) Annual Average I/I: 2.72 mgd
- MassDEP Administrative Actions since 2010: ACO-NE-11-015 (July 2011)
- EPA Clean Water Act Administrative Order: EPA Docket No. 11-015 (July 2011)

Latest I/I or SSES Reports:

- Sewer System Evaluation Survey - Phase 5: Sewer Basins 4, 5 & 14 (May 2015)
- Sewer System Evaluation Survey - Phase 6: Sewer Basins 2, 11 & 13 (March 2016)
- Sewer System Evaluation Survey - Phase 7: Sewer Basins 8 & 12 (July 2017)
- Sewer System Evaluation Survey - Phase 8: Sewer Basin 01 (January 2018)
- Sewer System Evaluation Survey - Phase 9: Sewer Basins 06 & 07 (August 2018)

Private Source Inflow Removal Program: The Town is using the February 2012 *Lexington Sewer Use Code Review* to update their current regulations to incorporate a sewer bank or other funding options that may be adopted by the town. A private inflow program based on the February 2012 Private Inflow Removal Program Letter Report is currently on hold.

I/I Rehabilitation Projects in Design or Construction: The Sewer System Evaluation Survey for Sewer Basins 08 and 12 (Phase 7) Final Report was completed in July 2017. The project identified approximately 176,000 gpd of removable peak infiltration. The design for the recommended rehabilitations is being drafted and is scheduled for public bid in Fall 2019.

The Sewer System Evaluation Survey for Sewer Basins 06 and 07 (Phase 9) was completed in April 2018. The project identified approximately 62,500 gpd of removable peak I/I in 47,000 LF of sewer main.

The Phase 6 Sewer System Improvements construction started in February 2019 and was substantially complete in June 2019. This project's goal was to remove I/I primarily in Sewer Basins 02 and 12. In December 2018, \$1,560,000 in grant/loan funds were distributed for the Phase 6 Sewer System Improvements Construction Project (MWRA Project No. WRA-P9-17-3-993). Details of this project are included in Attachment 4.

Town-Wide Flow Metering was performed from mid-March through the beginning of June 2019. There were 19 meters in total to cover the 14 sewer basins along with three rain gauges and four groundwater gauges. This metering will be used to quantify I/I in each sewer basin.

Reporting Period Activity: Two (2) new individual residential sewer services were created at two new lots. Five (5) homes were placed on the sewer system as a result of five (5) individual septic abandonments. Seven (7) new residential units were connected to the sewer system (these connections were made at the subdivision near the property of 163 Cedar Street). Four (4) new residential units were connected as a result of a balanced housing subdivision that will have a total of (29) twenty-nine units to be completed next year (this subdivision is located off Grove Street near the Bedford Town line). One (1) small day care facility was added in Basin 12. A seventy-two (72) unit senior living facility was added in Basin 12.

The following change to the Sewer Use Code has been implemented. This proposed change was approved on February 25, 2019, by the Board of Selectmen.

#### **Section 181-44 (G)**

##### **Capacity Fee**

All new connections greater than 15,000 gpd to the municipal sanitary system shall be charged a one-time Capacity Fee in accordance with the following fee schedule:

##### **Required Fee**

Applicant must remove four (4) gallons of I/I from the sewer system for each one gallon of permitted wastewater flow requested (Title V (310 CMR 15) shall be used to determine flow rates).

If there are no sources of I/I which, at the discretion of the town, are appropriate for removal at the time of the permit, a monetary fee may be required.

The fee shall be calculated based on Title V flows and a cost of the Town of Lexington's existing transportation and treatment (T&T) cost per gallon of flow per day (gpd). This transportation and treatment cost is calculated yearly and must be approved by the Town Engineer. Please contact the Town Engineer to confirm the current transportation and treatment cost.

For example, if a development has an associated Title V flow of 15,000 gpd, the fee for this connection is 15,000 gpd x T&T Cost x 4). All dollar values shall be rounded up to the nearest fifty dollars (\$50).

A combination of I/I removal and monetary fees may also be negotiated at the discretion of the town. Any I/I removed from the sewer system as part of this program shall be the property of the Town of Lexington and may not be applied to future removal requirements without the written authorization of the town.

MWRA I/I Local Financial Assistance Program: The community has financed twelve (12) I/I reduction projects through the Authority's funding assistance program. Of the \$12,125,300 allotted through the Program's Phases 1 - 13, the community has \$3,120,000 remaining in funding assistance.

## **18. MALDEN: North System**

### Background Information:

- Miles of Sewer: 100
- Sewered Population: 60,940
- Three Year (CY16 - CY18) Annual Average I/I: 3.81 mgd
- MassDEP Administrative Actions since 2010: NON #00004556 – May 9, 2018 Failed to submit I/I Analysis due 12/31/17
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-002 (January 2009)

Latest I/I or SSES Report: Malden Sewer System Evaluation Survey (Phase III) Final Report (December 2011)  
Hydraulic Model and Capacity Assessment Draft Report (June 2012)  
Hydraulic Model and Capacity Assessment Final Report (December 2012)

Private Source Inflow Removal Program: No additional inspections were reported. The City continues to monitor potential private inflow sources.

I/I Rehabilitation Projects in Design or Construction: No sewer rehabilitation projects or significant sewer maintenance activities over this reporting period. However, the City has contracted with the engineering firm Nangle Consulting Associates Inc. to conduct a comprehensive I/I and sewer flow analysis, including a flow metering program, and other means of identifying I/I in targeted portions of the City's sewer collection system. The SSES work began in the spring 2019. Upon completion of the study and analysis of the results, the City will design construction projects to remediate areas identified as problematic.

Reporting Period Activity: The City of Malden DPW Commission voted to approve a revised Water & Sewer Fee schedule on October 9, 2018. This includes a new sewer connection fee of \$500. Plus an I/I fee of \$8.50/gpd for new connections with a design flow over 15,000 gpd.

In December 2018, \$1,048,000 in MWRA grant/loan funds were distributed for a Flow Monitoring and SSES Project - Design and Construction (MWRA Project No. WRA-P9-18-3-996). Details of this project are included in Attachment 4.

MWRA I/I Local Financial Assistance Program: The community has financed six (6) I/I reduction projects through the Authority's funding assistance program. Of the \$20,683,900 allotted through the Program's Phases 1 - 13, the community has \$15,042,000 remaining in funding assistance.

## **19. MEDFORD: North System**

### Background Information:

- Miles of Sewer: 113
- Sewered Population: 57,757
- Three Year (CY16 - CY18) Annual Average I/I: 3.26 mgd
- MassDEP Administrative Actions since 2010: None
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-027 (August 2009)

### Latest I/I or SSES Report:

Continuation of Sewer System Evaluation Survey of North Medford/Heights Area (October 2016)  
Continuation of Mini-System "P" SSES (October 2016)  
City-wide I/I Control Plan Metering Program (April 2018)

Private Source Inflow Removal Program: As part of the ongoing SSES studies (and as recently requested by MassDEP), the development of a Private Inflow Source Removal Plan will begin in FY19.

I/I Rehabilitation Projects in Design or Construction: Catch Basin removal in North Medford is complete.  
The SSES - Phase 2 Study in North Medford is complete. The SSES - Phase 2 Study in Mini-System P is complete.

City-Wide I/I Metering Year 1 Report is complete. Year 2 field work is complete. Summary Report due to DEP in December 2019. Mini-System P Rehab contract delayed (to be bid in Fall 2019).

Reporting Period Activity: Sewer Rehabilitation work in Mini-System F took place in June 2019 and included the lining of Manholes F-022 to F-033 (Locust Street.). Follow-up metering to be completed once development is 90% occupied. Awaiting on proposal from developer for an inflow removal (catch basin) project recommendation in Mini-System G.

MWRA I/I Local Financial Assistance Program: The community has financed nine (9) I/I reduction projects through the Authority's funding assistance program. Of the \$19,637,600 allotted through the Program's Phases 1 - 13, the community has \$11,676,000 remaining in funding assistance.

## **20. MELROSE: North System**

### **Background Information:**

- Miles of Sewer: 74
- Sewered Population: 28,333
- Three Year (CY16 - CY18) Annual Average I/I: 2.45 mgd
- MassDEP Administrative Actions: None

### **Latest I/I or SSES Report:**

Summary Letter Report for Sewer System Investigations - Subareas 21 & 22 (May 2014)  
Summary Letter Report for Sewer System Investigations & Mapping (August 2014)  
City-wide I/I Flow Metering (December 2016)  
Sewer System Investigation and Evaluation (Spring 2017)  
2017 Sewer Rehabilitation Project - CIPP Lining (Winter 2017)  
2018 Sewer Rehabilitation Project - Open Cut Repairs (Fall 2018)  
2019 Phase 2 SSES Project (CCTV, Flow Isolation, Smoke Testing, MH Insp.) (Spring 2019)

Private Source Inflow Removal Program: Smoke testing was performed in the first five subareas where investigations were done. A number of potential private inflow sources were discovered. In addition to those discovered through smoke testing, other potential sources of private inflow were discovered while doing post-CIPP flow isolation. These will be investigated in the near future. Smoke testing is planned for Fall 2019 for the next four subareas. The community has also completed drafting an I/I educational brochure which is planned to be distributed City-wide.

I/I Rehabilitation Projects in Design or Construction: In Spring 2016, sewer flow metering was performed Citywide, with 29 meters operating for 10 weeks. Groundwater and rainfall monitoring were also performed during this period. The flow metering report was completed in December 2016. The data summarized in this report were used to select the top five subareas for follow-up SSES work, which was performed in 2017. Work performed since the last report in July 2018 has included the following:

- A small amount of sewer lining work remained from the 2018 lining project that extended into the Fall/Winter 2018 and spring 2019. This work included lining in an easement off of Carlida Road and Windsor Street that had significant access restrictions that the City was able to overcome by piggybacking on a National Grid project where matting was already being installed to traverse cross-country wetland areas.
- Inland Waters cement-lined 24 sewer manholes. This included two manholes on Penney Road that were experiencing significant infiltration and were preventing the lining of a final segment of pipe on Penney Road. Following the spring 2018 pipe-bursting project on Penney Road (to replace an area that was originally scheduled for lining but was unable to be lined due to the amount of groundwater infiltration), manholes required lining to allow the final downstream sewer segment to be slip lined. The final sewer lining in this segment is scheduled for August 2019.
- Open cut sewer replacement in areas that were identified with needs in the 2017 SSES but were not able to be lined began over the last year. This included replacement of a segment of sewer on Howard Street that ended up requiring pipe bursting due to a conflicting high voltage duct bank. Work completed in July 2019. Other replacement work was completed between Fall 2018 and July 2019. The work of this contract is expected to be completed by the end of Summer 2019.
- Additional flow metering is currently being performed in Subarea 15 due to the high inflow volumes measured in 2016's flow metering program. This work began in Spring 2019 and is expected to be completed in Summer 2019. It involves seven meters presently breaking Subarea 15 down into smaller areas to focus on the high inflow sources.



- Inland Waters is performing 2019 SSES work in the second phase subareas identified during the Spring 2016 flow monitoring as contributing the highest I/I to the system. CCTV and manhole inspections in these four subareas are now complete, and flow isolation is nearing completion. Smoke testing will be performed in Fall 2019.
- Rapid Flow is performing warranty inspections of their lining work and has a handful of areas in which to complete post-lining flow isolation. Until this data is obtained, the final I/I reduction numbers from the lining program will not be available.

Reporting Period Activity: In June 2016, the Board of Aldermen voted in favor of an ordinance to increase the City's infiltration and inflow mitigation fee from \$2.14 per gallon per day (gpd) to \$6.89/gpd. This revised cost reflects the actual cost of the Subarea 21 and 22 project per gpd of I/I removal, accounting for design, construction, and construction administration costs. The cost was confirmed to still be accurate following the 2017 and 2018 sewer investigation and lining projects. This fee is now being routinely charged to all projects for which a Title 5 flow increase is apparent from the building permit application. In 2017, the City instituted a process with the Inspectional Services Department to ensure that I/I fee reviews are occurring for all applicable projects. During FY19, the City collected \$39,761.50 in I/I mitigation fees through this mechanism, which is kept in a dedicated fund and is only used for work related to I/I reduction.

In spring 2016, the City retained the services of Raftelis/Woodcock & Associates to review the water and sewer rate structure and recommend improvements. The City's Board of Aldermen voted to modify the tiered rate structure to have only two tiers (rather than three) and to increase both water and sewer base fees for FY17. For both FY18, FY19, and FY20, the City has continued to increase sewer base fees to reach the targeted goal of having base fees equate to 10% of operating costs in the Sewer Enterprise Fund. When the new rates take effect on October 1, 2019, this goal will have been reached.

In March 2019, \$1,081,000 in MWRA grant/loan funds were distributed from MWRA for Additional Funding for 2018 Open-Cut Sewer Rehabilitation (WRA Project No. WRA-P9-20-3-979). Details of these projects are included in Attachment 4 (MWRA Project No. WRA-P11-20-3-1103).

MWRA I/I Local Financial Assistance Program: The community has financed nine (9) I/I reduction projects through the Authority's funding assistance program. Of the \$10,126,300 allotted through the Program's Phases 1 - 13, the community has \$2,969,000 remaining in funding assistance.

## **21. MILTON: South System (Small Portion Tributary to the North System)**

Background Information:

- Miles of Sewer: 83
- Sewered Population: 26,941
- Three Year (CY16 - CY18) Annual Average I/I: 1.87 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: I/I Town-Wide Sewer Evaluation – Year 10 (February 2015)  
 I/I Town-Wide Sewer Evaluation – Year 11 (February 2016)  
 I/I Town-Wide Sewer Evaluation – Year 12 (January 2017)  
 I/I Town-Wide Sewer Evaluation – Year 13 (December 2017)  
 I/I Town-Wide Sewer Evaluation – Year 14 (November 2018)  
 Wastewater Capital Improvement Plan Priority Evaluation (October 2018)  
 CIP Program 1 Investigation (Ongoing)

Private Source Inflow Removal Program: The Town is continuing to pursue the removal of sump pumps and other private inflow sources identified through a previously completed building inspection program. All new connections to the municipal sanitary sewer system will be charged a one-time I/I mitigation fee. Connection applicants must remove four gallons of I/I from the sewer system for each one gallon of new wastewater flow requested in the connection permit. If there are not sources of I/I that, at the discretion of the DPW Director, are appropriate for removal at the time of the permit, a monetary fee may be required (at a cost of \$3.00 per gallon of flow per day to be removed). Also, a building inspection is performed during the final water meter reading when a house is being sold. If the building inspection identifies an illegally connected sump pump, a fine is issued and the house cannot be sold until the sump pump has been rerouted and inspected.

#### I/I Rehabilitation Projects in Design or Construction:

The Year 14 Sewer System Infiltration Rehabilitation [MWRA Project No. WRA-P11-21-3-1123 / Milton Contract No. S19-1] has been bid and construction is set to begin Summer 2019. Work will be performed in Subareas G-04 / G-06 / G-07 / G-11B / G-11E / PS-02 / PS-03 / S-17A / S-18 and includes 15,900 LF of cleaning and television inspection; testing 3380 sewer joints and sealing 1690 sewer joints; installing 10,900 LF of CIP pipe; installing 169 LF of CIP short liners; grouting 209 reinstated service connections; installing seven (7) CIP lateral liners; performing two (2) open cut point repairs; cutting four (4) protruding service connections; testing and grouting 46 service connections; rehabilitating 44 sewer manholes; topside inspection of 24 sewer manholes; and performing 22,350 LF of post-construction flow isolation. It is estimated that the Year 14 project will remove 66,456 gpd of infiltration from the Town's sewer system.

Year 13 Sewer System Infiltration Rehabilitation [MWRA Project No. WRA-P9-21-3-987 / Milton Contract S18-1] was bid in June 2018 with construction beginning in August 2018. Work was performed in Subareas DI-02 / G-03A / G-03C / G-08D / G-09 / G-10A / G-10B / G-11D / S-01 / S-01A / S-07B / S-07D / S-08 and included approximately: 15,300 LF of cleaning and television inspection; 9725 LF of testing and sealing of joints; installing 8600 LF of CIP pipe; installing 209 LF of CIP short liners; performing three open cut point repairs; cutting three protruding service connections; testing and grouting 161 service connections; rehabilitating 34 manholes; topside inspection of 43 sewer manholes; and performing 20,425 LF of post-construction flow isolation. Year 13 Sewer System Infiltration Rehabilitation has reached substantial completion with Warranty Retesting completed Summer 2019.

Year 12 Sewer System Infiltration Rehabilitation [MWRA Project No. WRA-P9-21-3-972 / Milton Contract S17-1] was bid June 2017. Construction began in August 2017. Work was performed in Subareas G-02A / G-03B / G-03D / G-09 / G-10A / G-16 / G-17 / G-19 / G-20 / S-01 / S-01A and included approximately 4370 LF of cleaning and TV inspection; 17,000 LF of testing and sealing of joints; performing 1075 LF of chemical root treatment; installing 5080 LF of CIP pipe; installing 230 LF of CIP short liners; cutting one protruding service connection; testing and grouting 110 service connections; rehabilitating 71 manholes; installing 12 manhole inflow dishes; replacing 4 manhole frames and covers; TV inspection of 4270 LF of sewer and topside inspection of 30 sewer manholes; and performing 22,000 LF of post-construction flow isolation. Year 12 Sewer System Infiltration Rehabilitation has reached substantial completion with Warranty Retesting completed Spring 2019. The Year 12 project is estimated to have removed 56,376 gpd of infiltration from the Town's sewer system.

Year 11 Sewer System Infiltration Rehabilitation [MWRA Project No. WRA-P9-21-3-948 / Milton Contract S16-1] has reached substantial completion with Warranty Retesting work completed in Spring 2018. The Year 11 project is estimated to have removed 36,504 gpd of infiltration from the Town's sewer system.

#### Reporting Period Activity:

CIP Program 1 Investigation was completed Spring 2019 (MWRA Project No. WRA-P11-21-3-1123). Data review and reporting is ongoing. Work included cleaning, TV inspection, videotaping and recording 51,400 LF of sewer; conducting flow isolation on 50,100 LF of sewer; and performing topside manhole inspections of 300 sewer manholes in Subareas DI-02 / G-05A / G-05B / G-05C.

Year 14 I/I Rehabilitation Investigation (MWRA Project No. WRA-P9-21-3-987) was completed Spring 2018 (Subareas G-04 / G-06 / G-07 / G-11B / G-11E / PS-02 / PS-03 / S-17A / S-18). Work included cleaning, TV inspection, videotaping and recording 47,600 LF of sewer; conducting flow isolation on 45,500 LF of sewer; and performing topside manhole inspections of 270 sewer manholes. Summary Report completed November 2018. Approximately 146,592 gpd of peak infiltration was observed during television inspections and 10,368 gpd of peak infiltration was identified during manhole inspections.

Year 13 I/I Rehabilitation Investigation (MWRA Project No. WRA-P9-21-3-972) was completed Spring 2017 (Subareas G-03A / G-03C / S-07B / S-07D / S-08). Data review/report preparation completed January 2018. CCTV inspection revealed an estimated 91,440 gpd of peak infiltration. Topside manhole inspection revealed an estimated 19,152 gpd of peak infiltration.

Approximately 2860 LF of 8-inch PVC sewers were added to Milton's sewer system on Woodlot Drive and Marine Road. These two neighborhoods include 30 connections for new single-family homes. In addition, there were 14 connections made in existing sewers for new properties in various locations.

MWRA I/I Local Financial Assistance Program: The community has financed twenty (20) I/I reduction projects through the Authority's funding assistance program. Of the \$9,014,500 allotted through the Program's Phases 1 - 13, the community has \$3,450,000 remaining in funding assistance.

## **22. NATICK: South System**

### **Background Information:**

- Miles of Sewer: 145
- Sewered Population: 32,281
- Three Year (CY16 - CY18) Annual Average I/I: 1.05 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: Town-Wide SSES (Ongoing)  
I/I Study (Ongoing)

Private Source Inflow Removal Program: The SSES (MWRA Project No. WRA-P5-22-1-523) included a house-to-house inspection component. Home inspections are also conducted in conjunction with a water meter replacement program. The Town has prepared an informational handout on eliminating sump pump connections to the wastewater system, which is distributed to targeted/suspect areas of the community.

I/I Rehabilitation Projects in Design or Construction: Sewer inspection work (MWRA Project No. WRA-P9-22-3-912) which included CCTV and a chimney inspection program is complete. To date, 145,000 LF of CCTV inspection has been completed and 766 manhole inspections performed in Sewer Basins 6 / 11/ 14 / 16. Recommended findings from this inspection work will be incorporated into a sewer rehabilitation contract (MWRA Project No. WRA-P9-22-3-990).

Reporting Period Activity: The Town has completed the purchase of the CCTV inspection vehicle (MWRA Project No. WRA-P9-22-1-966). Training on the equipment has been completed. The vehicle (with Town personnel) performed a portion of the above CCTV inspection work.

Extensions of the collection system: Subdivision development started this year (McHugh Farms): 33 unit cluster development that will include 115 bedrooms which would yield 12,650 gpd (based upon Title V). Approximately 2645 LF of 8-inch PVC gravity sewer and 14 manholes will be installed as part of this project. A six unit development is being built on Stacey Street. Each unit has three bedrooms for a total of 18 bedrooms. This yields an increase in flow of 1980 gpd (based upon Title V). There is no additional piping in the roadway (just services from the main to the units). Commercial/large flow additions: 1075 Worcester Street Exponent: tear down and rebuild of new commercial building on this site (936 gpd based on Title V) of flow will be added to the system. Building will be connecting into exiting sewer service (but adding pipe on their property); 1225 Worcester Street (Old Sam's Club site): tear down of Old Sam's Club building. A development of an Over 62 Community and hotel will be added. The increased sewer flow is 33,574 gpd (based upon Title V).

MWRA I/I Local Financial Assistance Program: The community has financed ten (10) I/I reduction projects through the Authority's funding assistance program. Of the \$9,332,600 allotted through the Program's Phases 1 - 13, the community has \$4,719,000 remaining in funding assistance.

## **23. NEEDHAM: South System**

### **Background Information:**

- Miles of Sewer: 132
- Sewered Population: 29,577
- Three Year (CY16 - CY18) Annual Average I/I: 1.80 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: Town-Wide Infiltration/Inflow Report (October 2013)  
Phase I I/I Investigation Report (June 2015)  
Reservoir B Tributary Investigation (July 2015)  
Phase II I/I Investigation Report (August 2016)  
CCTV Inspection: Beech / Webster Street Area (April 2017)  
CCTV Inspection (Ongoing)

Private Source Inflow Removal Program: A private source identification program, using Town-owned CCTV equipment, is ongoing.

#### I/I Rehabilitation Projects in Design or Construction:

Alden Road Pump Station Wet Well Replacement (MWRA Project No. WRA-P9-23-3-985): Design completed June 2018. Project bid August 2018. Construction completed Spring 2019. Work is estimated to eliminate 3206 gpd of peak infiltration. 2019 Sewer Rehabilitation Contract design completed Summer 2019. Project bid opening in August 2019. Rehabilitation construction to be complete Spring 2020. A total of 464,880 gpd of peak infiltration is anticipated to be removed from the sanitary system upon contract completion.

Reporting Period Activity: The Town is currently performing an evaluation of the I-95 interceptor to assess influent flows and the condition of the interceptor.

Four sewer manholes were replaced (12,600 gpd of infiltration removed); CIPP lining occurred at four locations (21,150 gpd of infiltration removed); CIPP point repair occurred at ten locations (13,140 gpd of infiltration removed); CIPP lateral lining undertaken at five locations (10,800 gpd of infiltration removed); Replacing service wyes was performed at fifteen locations (26,240 gpd of infiltration removed); Sealing laterals was performed at seven locations (7200 gpd of infiltration removed).

Twelve meters (ten permanent and two portable area velocity flow module) have been installed for continued I/I monitoring. Town-wide TV inspection of 178,000 LF of sewer main was completed as part of the Phase II I/I Investigation Report (over 680,000 gpd of peak infiltration observed).

MWRA I/I Local Financial Assistance Program: The community has financed ten (10) I/I reduction projects through the Authority's funding assistance program. Of the \$9,977,600 allotted through the Program's Phases 1 - 13, the community has \$6,759,000 remaining in funding assistance.

## 24. NEWTON: North and South Systems

#### Background Information:

- Miles of Sewer: 271
- Sewered Population: 88,718
- Three Year (CY16 - CY18) Annual Average I/I: 7.00 mgd
- MassDEP Administrative Actions since 2010: None

#### Latest I/I or SSES Reports:

CIP - Project 3 Inspection & Assessment Report (January 2015)  
CIP - Project 4 Inspection & Assessment Report (February 2015)  
CIP - Project 5 Inspection and Assessment Report (November 2015)  
Smoke Testing in Subareas B066 & B071 (March 2016)  
CIP - Project 1 Post Construction Flow Evaluation (April 2016)  
CIP - Project 6 Inspection and Assessment Report (June 2017)  
CIP - Project 7 Inspection and Assessment Report (April 2018)  
CIP - Project 8 Inspection and Assessment (March 2019)  
CIP - Project 3 and 4 Flow Evaluation (January 2019)  
CIP Project 9 Inspection and Assessment (Ongoing)

Private Source Inflow Removal Program: Private Inflow Source Removal for FY2019 consists of two sump pumps, one open cleanout and one catch basin in parking lot.

#### I/I Rehabilitation Projects in Design or Construction:

CIP Project 3 and 4 Rehabilitations are complete. CIP Project 3 and 4 Flow Evaluation is complete and identified an estimated 355,531 gpd of peak infiltration removed.

CIP Project 5 Rehabilitations (Invitation for Bid #18-05) is complete. Warranty retest inspections are also complete. Project documentation review and as-built tables / warranty retest tables tabulation is ongoing.

CIP Project 6 Rehabilitations is currently under construction. The project is scheduled to be completed by October 4, 2019. The estimated I/I removal is 299,399 gpd of peak infiltration, 64,224 gpd of peak rain-induced infiltration and 501,408 gpd of peak inflow.

CIP Project 7 Rehabilitations is currently being designed and is scheduled to be bid Fall 2019. The estimated I/I removal is 165,051 gpd of peak infiltration, 71,784 gpd of peak rain-induced infiltration and 102,112 gpd of peak inflow. In November 2018, \$4,580,000 in MWRA grant/loan funds were distributed for the construction of CIP Project 7 Sewer Rehabilitation (MWRA Project No. WRA-P9-24-3-991). Details of this project are included in Attachment 4.

Completed CIP Project 8 Inspection and Assessment. Work included inspection of 138,354 LF of sewer and 854 sewer manholes. The estimated I/I removal is 658,788 gpd of peak infiltration and 92,967 gpd of peak inflow.

CIP Project 9 Inspection and Assessment is ongoing. Work includes inspection of 125,229 LF of sewer and 847 sewer manholes.

MWRA I/I Local Financial Assistance Program: The community has financed twenty-eight (28) I/I reduction projects through the Authority's funding assistance program. Of the \$34,937,400 allotted through the Program's Phases 1 - 13, the community has \$9,160,000 remaining in funding assistance.

## **25. NORWOOD: South System**

Background Information:

- Miles of Sewer: 83
- Sewered Population: 29,032
- Three Year (CY16 - CY18) Annual Average I/I: 3.53 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: I/I Assessment and GIS Tracking Program (2019)

Private Source Inflow Removal Program: Within the Hawes Brook sewer tributary area, eight property owners have been notified to redirect sump pumps. As part of the Meadowbrook Area Sewer Inspection, ten buildings were identified with various illicit connections and eleven sources have been removed to date.

I/I Rehabilitation Projects in Design or Construction:

Meadowbrook Priority Area 5 Rehabilitation Design (MWRA Project No. WRA-P9-25-3-964) completed Summer 2018. Meadowbrook Priority Area 5 Rehabilitation Construction (MWRA Project No. WRA-P9-25-3-974 / Town Bid No. NPW-19-03) bid September 2018. Rehabilitation work includes CIPP lining of 7515 LF of sewer main, installation of 600 LF of 8-inch PVC sewer main, lining 38 sewer manholes and lining 123 house service connections.

Area 3 and Area 4 Sewer Rehabilitation Project is complete. Rehabilitation work included CIPP lining 8245 LF of sewer main, CIPP lining of 217 service connections, manhole rehabilitation and installation of 605 LF of 8-inch PVC sewer main.

Underdrain Manhole Rehabilitation Project (MWRA Project No. WRA-P9-25-3-917) is complete. Hawes Brook-Westover Parkway Area Sewer Rehabilitation Construction is complete.

Meadowbrook Area Sewer Rehabilitation Project is complete. Rehabilitation work included CIPP lining 8190 LF of sewer main, manhole rehabilitation and the CIPP lining of 299 service connections.

Hospital and Florence Avenue Areas Sewer Rehabilitation (SRF Project) is complete. Project work included CIPP lining 7500 LF of 6 to 12-inch sewer main, manhole rehabilitation and CIPP lining 100 house service connections.

Reporting Period Activity: I/I Assessment and GIS Tracking Program (MWRA Project No. WRA-P9-25-1-919) work is substantially complete.

MWRA I/I Local Financial Assistance Program: The community has financed twenty-one (21) I/I reduction projects through the Authority's funding assistance program. Of the \$11,589,400 allotted through the Program's Phases 1 - 13, the community has \$4,710,000 remaining in funding assistance.

## 26. QUINCY: South System

### Background Information:

- Miles of Sewer: 230
- Sewered Population: 94,166
- Three Year (CY16 - CY18) Annual Average I/I: 5.06 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: Coastal Structures I/I Evaluation / Identification Study (Ongoing)  
Sea Street CCTV Assessment (January 2016)  
NW Quincy Sewer Interceptor TV Inspection (February 2016)  
SSES & I/I Identification Plan (July 2016)  
Sewer System Evaluation Survey Phase III (March 2018)  
Wollaston Beach Sewer System Evaluation Phase 1 (March 2018)  
Fall 2018 Sewer Investigation (April 2019)

Private Source Inflow Removal Program: The City has partnered with the Plumbing Inspector on its FOG Program. As part of this program, the inspector visits CV License Holders for Grease Trap Inspections. While inspecting for grease traps, the inspector also observes the property for illegal inflow connections. Although this program directly addresses FOG discharges, it has been successful in identifying direct private inflow sources for removal.

The City's Storm Water Discharge Ordinance has been approved. The ordinance forbids non-sanitary connections. A new fee structure was made effective July 1, 2013 and outlines penalties for illegal connections/discharges to the sanitary sewer system ( <http://www.quincyma.gov/government/pwd/watersewerfees.cfm> ). The fee structure mentioned remains in effect and has resulted in improvements to the system.

Developers contribute one percent of total project value to the Sewer Rehabilitation Fund. Additionally, the City has begun to implement 310 CMR 12.04 and require those new connections whose flow exceeds 15,000 GPD to continue to the 4:1 removal required under the regulations. This regulation is enforced during the site plan review process.

The City owns a CCTV sewer inspection vehicle. The vehicle provided significant input towards the development of the Coastal Structures I/I Evaluation / Identification Study. Also, many of the open cut and rehabilitation repairs on the Phase IIB Coastal Structures I/I Reduction Project were identified via the City's CCTV vehicle during I/I investigative efforts in the Houghs Neck area.

I/I Rehabilitation Projects in Design or Construction: It is anticipated that the City will be completing a significant amount of I/I reduction work over the coming years based upon the results of the July 2009 Coastal Structures I/I Evaluation / Identification Study.

Coastal manhole inspections were completed Summer 2009 with rehabilitation design completed Winter 2010. The Coastal Manhole Rehabilitation Construction Contract I was completed during Summer 2011. Work included the rehabilitation of 139 manholes and is estimated to have removed approximately 0.50 mgd of I/I. This work was partially funded through the MWRA I/I Local Financial Assistance Program.

Additional manhole inspections and sewer CCTV inspections were conducted during 2010/2011. Recommendations from this work resulted in the Phase IIA Coastal Structures I/I Reduction Project (MWRA Project No. WRA-P7-26-3-737). This project was bid in August 2011. Rehabilitation construction is complete. Warranty retesting work was performed in Summer 2013. Phase IIA work is estimated to have removed 0.85 mgd of peak I/I.

The Phase IIB Coastal Structures I/I Reduction Project (MWRA Project No. WRA-P9-26-3-903) was bid in June 2015. Construction commenced in Spring 2016 and was completed Fall 2016. Work under this phase included cleaning & TV inspection of 13,710 LF of sewer main and 103 service laterals and CIPP lining of 6870 LF of sewer main and 66 service laterals in the Houghs Neck / Sea Street / Black's Creek / Furnace Brook Parkway areas. Phase IIB work is estimated to have removed 0.65 mgd of peak I/I. The project also included the cleaning, CCTV inspection and condition assessment of 4600 LF of sewer main within areas of suspected high groundwater or coastal impact (Black's Creek and St. Moritz Pond).

### Reporting Period Activity:

The Sanitary Sewer Evaluation Survey (SSES) Phase III Project was completed Spring 2019 (MWRA Project No. WRA-P9-26-13-944). Project work included: (1) Smoke Testing 48,000 LF of sewer to identify segments of pipe with direct/indirect inflow sources. Smoke Testing was conducted during periods of low groundwater and after sufficient time has elapsed from

previous rainfall events; (2) Flow isolating 68,500 LF of sewer to quantify infiltration amounts within manhole-to-manhole segments of sewer. The inspection was conducted between the hours of 12AM and 6AM when groundwater levels are typically at their highest and sanitary flows are at a minimum; (3) Cleaning, TV inspecting, videotaping and recording 76,000 LF of sewer. The TV inspection was performed to locate problem areas and I/I sources within manhole-to-manhole segments of sewer; (4) Conducting topside physical survey of 576 sewer manholes for defects and I/I sources. A written log was furnished for each manhole inspected; and (5) Preparing a SSES Summary Report that details areas in which the above work was performed, summarizing work completed to date and including recommendations, a cost-effectiveness analysis and prioritization analysis for rehabilitation of pipeline/manhole defects and I/I sources identified during this investigation. Estimated rehabilitation costs was also provided. Also, a City-wide sewer system hydraulic model for critical lateral and interceptor sewers was developed. Of the 68,500 LF of sewer pipe flow isolated, approximately 6300 LF had infiltration rates higher than 4000 gpd/ldm. Of the 76,600 LF of sewer pipe CCTV inspected, approximately 48,900 LF was recommended to be structurally lined and approximately 8300 LF was recommended to be replaced by open cut excavation.

The Fall 2018 Sewer Investigation (MWRA Project No. WRA-P9-26-13-944) investigation work is complete [20,900 LF of CCTV inspection / 200 manholes inspected / Flow Monitoring (38 days) performed on 36"H x 24.5"W brick sewer on Newcomb Street and the 45"H x 30"W cross-country sewer that crosses Furnace Brook Parkway to Merrymount Parkway]. Summary Report completed April 2019.

Cross-Country Sewer Easement CCTV Inspections included light and heavy cleaning as required to CCTV inspect 311 LF of 6-inch sewer, 744 LF of 8-inch sewer, 991 LF of 10-inch sewer, 2025 LF of 18-inch sewer, 1799 LF of 24-inch sewer and 639 LF of 30" x 45" sanitary sewer traversing through critical cross-country portions of the sewer system.

Turner Street Utility Replacement Project included the replacement of the following: 448 LF of 8-inch DI water main, two gate valves, one hydrant with 6-inch hydrant valve, 448 LF of 8-inch PVC gravity sewer, two precast concrete sanitary sewer manholes, 100 LF of HDPE storm sewer and one defective sewer service lateral. Project work is complete.

The Wollaston Beach Area SSES Phase 1 (MWRA Project No. WRA-P9-26-3-954) revealed 186,000 gpd of I/I contributing to the sewer system. Phase 1 rehabilitation design (MWRA Project No. WRA-P9-26-3-954) is complete with bidding performed in May 2017. Wollaston Beach Area SSES Rehabilitation Phase 1 (MWRA Project No. WRA-P9-26-3-962 / Quincy Contract No. 17-329) is complete. Sewer rehabilitation work included 4800 LF of cleaning, inspection, testing and sealing of joints; open cut point repair within 80 LF of sewer main; CIP lining 20,000 LF of sewer main; installing CIP structural short liners in 60 LF of sewer main; cutting one (1) protruding service connection; grouting 35 service connections at the sewer main; and rehabilitating (via interior sealing and exterior grouting) 175 manholes.

Bayside Road Sewer Rehabilitation (MWRA Project No. WRA-P9-26-3-954): This area of sewer is highly susceptible to tidal I/I (Bayside Beach area). During initial CCTV, no infiltration was observed, however, staining along the sewer mains was observed indicating some evidence of infiltration. Rehabilitation involved lining approximately 3048 LF of 8 and 12-inch sewer main and 11 manholes.

John Street Lateral Repair (MWRA Project No. WRA-P9-26-3-954): Review of CCTV tapes along the John Street sewer main revealed multiple deficiencies in the service lateral connections. John Street is located adjacent to the Neponset River in an area of high groundwater. The sewer main is very shallow with little slope. Nine (9) service laterals were replaced via open cut. Project work was completed Summer 2017.

Large Diameter Sewer Survey (MWRA Project No. WRA-P9-26-3-954): This project included the heavy cleaning and CCTV inspection of 14,500 LF of 10, 15, 24 x 36 and 30 x 45-inch sewer interceptors. During this project, the City experienced a sewer emergency on an interceptor in Quincy Center. With approval from the MWRA, funds from this project were expended to remedy that sewer main emergency in the Granite Street area. This emergency cleaning and CCTV work helped locate a direct source of inflow from the drainage system into the sewer system through a 12-inch main. The City undertook temporary repairs to eliminate the condition. Permanent repairs will be conducted as part of the Wollaston Beach Area SSES Rehabilitation Phase II Project (MWRA Project No. WRA-P9-26-3-971).

Wollaston Beach Area SSES Rehabilitation Phase II Project (MWRA Project No. WRA-P9-26-3-971): Project bid in June 2018. Sewer rehabilitation work included approximately: 2670 LF of cleaning, inspection, testing and sealing of joints; heavy cleaning and inspecting 514 LF of sewer; exterior sealing and cementitious lining of 1526 VF of sewer manholes; chemical root treatment of 9411 LF of sewer; installing 16 LF of short liner; installing CIP pipe from manhole-to-manhole in 21,129 LF of sewer; television inspecting, testing and sealing 57 service connections and cutting three (3) protruding service connections. Construction completed in April 2019. Warranty retest inspection work scheduled for Fall 2019.

The FY19 CIPP Sewer Improvements - Contract 1 (MWRA Project No. WRA-P9-26-3-992) work began April 2019. Project work includes: CIPP lining [(8237 LF Total within 8 to 30 x 45-inch sewer pipe) on Newcomb Street / Armory Street / Sharon Road / Colby Road / Faxon Road / Botolph Street / Watkins Street / Morse Street / Merrymount Parkway]; testing & sealing 1100 pipe joints; grouting 150 service connections; and rehabilitating 198 sewer manholes.

Avalon Beach & Bay Pointe Marina Easement Sewer Rehabilitation Project (MWRA Project No. WRA-P9-26-3-971): Sewer rehabilitation work included replacing 260 LF of 15-inch pipe; installing 750 LF of 20-inch CIP pipe and rehabilitating six (6) sewer manholes. Project work complete Spring 2018.

In August 2018, the City submitted a Clean Water State Revolving Fund (CWSRF) Project Evaluation Form (PEF) for the Strand Sewer Pump Station Upgrades. The project is listed on the CWSRF 2020 Intended Use Plan list in the amount of \$2,500,000. Also in August 2018, the City submitted a CWSRF PEF for FY2020 Sewer Improvements Project. The project is listed on the CWSRF 2020 Intended Use Plan list in the amount of \$5,600,000.

The FY2019 Sewer Open Cut and Pipe Bursting Project design work (3956 LF of sewer pipe on Island Avenue, Peterson Road, Amsterdam Avenue, Barnham Avenue, Belmont Street, Clement Terrace, Elmwood Park and Sherman Street) is ongoing. The 90% design drawings are complete with permitting commencing in June 2019.

Emergency Sewer Repairs included: (1) Southern Artery (8 LF of 12-inch sewer); (2) Hancock Street (12 LF of 10-inch sewer); (3) The Strand (12 LF of 4-inch sewer); (4) Botolph Street @ Clive Street (9 LF of 8-inch sewer); (5) Hamilton Street @ Barham Avenue (45 LF of 8-inch sewer); and (6) Fayette Street @ Hobart Street (10 LF of 8-inch sewer).

MWRA I/I Local Financial Assistance Program: The community has financed fifteen (15) I/I reduction projects through the Authority's funding assistance program. Of the \$32,780,000 allotted through the Program's Phases 1 - 13, the community has \$9,477,961 remaining in funding assistance.

## **27. RANDOLPH: South System**

Background Information:

- Miles of Sewer: 101
- Sewered Population: 34,203
- Three Year (CY16 - CY18) Annual Average I/I: 1.83 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: I/I Investigation - March 2010 Storm Events (July 2013)  
Wastewater System Metering Program (June 2017)

Private Source Inflow Removal Program: The Town developed a sump pump inspection and amnesty program. As a result of the program, the Town was contacted by 202 homeowners having sump pumps. Internal inspections were completed to determine sump pump locations. One hundred twenty-one homes (121) were determined to have sump pumps connected to the sewer system. Ninety-four (94) of these homes have drainage directly adjacent to the homes. Each of the 94 homes was inspected. Design was completed to redirect these sump pumps to the drainage system. Sump pump redirection construction is complete (Randolph Contract Nos. 08-SP1/2/3 / MWRA Project No. WRA-P6-27-3-655). Total peak flow inflow removed is estimated to be 0.61 mgd.

I/I Rehabilitation Projects in Design or Construction: An I/I Investigation Report (July 2013) was drafted for the community areas affected by the March 2010 storm events. As a result of that report, a rehabilitation contract (Randolph Contract 15-S1 / MWRA Project No. WRA-P8-27-3-820) was designed (March 2015) and bid (April 2015). Rehabilitation construction is complete and included lining of the Vine Street Pump Station wet well, CIPP lining 1600 LF of sewer main, installing seven short liners, grouting of 24 service connections, installing nine manhole liners, digging and replacing two sewer mains, testing and sealing of 5500 LF of sewer main and root removal within 500 LF of sewer main.

Reporting Period Activity: A Town-wide wastewater flow metering program was performed during Spring 2017. Data review/report preparation completed Summer 2018. The Town is finalizing a SSES based on the Spring 2017 wastewater flow metering.

MWRA I/I Local Financial Assistance Program: The community has financed ten (10) I/I reduction projects through the Authority's funding assistance program. Of the \$10,070,800 allotted through the Program's Phases 1 - 13, the community has \$6,176,000 remaining in funding assistance.



## **28. READING: North System**

### Background Information:

- Miles of Sewer: 96
- Sewered Population: 25,579
- Three Year (CY16 - CY18) Annual Average I/I: 1.70 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: Infiltration and Inflow (I/I) Investigations Final Report (November 2012)  
I/I Investigations Report – Section 2 Supplement (November 2014)

Private Source Inflow Removal Program: One sump pump removed during this period. The Town is continuing to work with property owners where illicit connections were found during the Building Inspection Program. The Town will be working to set up a program over the next year to utilize some of the funds collected under development fees.

I/I Rehabilitation Projects in Design or Construction: Task Order # 3 to Master Services Agreement with CDM Smith executed February 14, 2019 (Collection System Modeling and Calibration).

Reporting Period Activity: The Town installed approximately 300 LF of gravity sewer main and approximately 1500 LF of service laterals to 38 residences. In addition, the Town received \$22,880.00 in sewer I/I connection fees from various developments in FY19.

In June 2019, \$1,040,000 in MWRA grant/loan funds were distributed by MWRA for the design and construction of the Sewer and Manhole Rehabilitation - Phase C. Details of this project are included in Attachment 4 (MWRA Project No. WRA-P11-28-3-1114).

MWRA I/I Local Financial Assistance Program: The community has financed ten (10) I/I reduction projects through the Authority's funding assistance program. Of the \$7,749,100 allotted through the Program's Phases 1 - 13, the community has \$2,080,000 remaining in funding assistance.

## **29. REVERE: North System**

### Background Information:

- Miles of Sewer: 98
- Sewered Population: 53,766
- Three Year (CY16 - CY18) Annual Average I/I: 2.79 mgd
- MassDEP Administrative Actions since 2010: None
- EPA Clean Water Act Administrative Order: CD 1:10-cv-11460 (November 16, 2010)

### Latest I/I or SSES Reports:

CMOM Program Development (CWSRF 3817) (March 2015)  
SSES - Phase VI and IDDE Planning Investigations (CWSRF 3908) (December 31, 2015)  
SSES - Phase VII Field Investigations (CWSRF 3956) (December 31, 2016)  
Illicit Connection Detection (CWSRF 3957) (December 31, 2016)  
SSES - Phase VIII Field Investigations (CWSRF 4054) (December 31, 2017)  
Illicit Connection Detection (CWSRF 4055) (December 31, 2017)  
SSES - Phase IX Field Investigations (CWSRF 4183) (December 31, 2018)  
Illicit Connection Detection (CWSRF 4176) (December 31, 2018)

Private Source Inflow Removal Program: Revere performed the following work:

During Contract 2 (CWSRF-3910) the City performed the following work:

A total of 18 properties were completed under Contract 2.

- 14 Properties were set up as a splash set up.
- 1 Properties was set up as connection to drain pipe.
- 3 Properties were set up as connection to catch basin/drain manhole.

During Contract 3B (CWSRF-4052) the City performed the following work:

A total of 39 properties were completed under Contract 3B.

- 21 Properties were completed as a splash set up.
- 10 Properties were set up as connection to drain pipe.
- 7 Properties were set up as connection to catch basin/drain manhole.
- 1 Property was set up as a leaching basin.
- Note that under Contract 3B was the Oliver Terrace Drain Extension. An additional four (4) properties at Oliver Terrace were added to this contract, which are already inclusive in the total number (39 properties) completed.
- A total of 136 LF of 12-inch DI drain was put in at Oliver Terrace connecting to two 4-inch diameter drain manholes and two 4-inch diameter catch basins.

The City Awarded Contract 3A (CWSRF-4052, WW-001) in September 2017 to Moriarty & Sons, Inc.

A total of 44 properties were completed under Contract 3A.

- 22 Properties were set up as a splash set up.
- 13 Properties were set up as connection to drain pipe.
- 9 Properties were set up as connection to catch basin/drain manhole.
- Note that under Contract 3A was the Fowler Avenue Drain Pipe Extension (SRF Eligible Fund).
- A total of 523 LF of 12-inch DI drain pipe was extended.
- A total of three drain manholes were installed at Fowler Avenue.
- A total of one catch basin connection was installed at Fowler Avenue.
- Under the Non-SRF Eligible Fund, a total of 963 LF of 8-inch PVC water main pipe was replaced at Fowler Avenue.
- A total of 28 properties were connected to the new/replacement 8-inch water main pipe at Fowler Avenue.

The City Awarded Contract 3C (CWSRF-4052, WW-003) in April of 2018 to Moriarty & Sons, Inc.

A total of 9 properties were completed under Contract 3C.

- 1 property was completed as a splash set up.
- 7 properties completed as a connection to catch basin/drain manhole.
- 1 property completed as a connection to drain pipe.

The City continues to maintain a (10:1) I/I removal ratio for new commercial and multi-family construction.

#### I/I Rehabilitation Projects in Design or Construction:

- Cured-in-place lining of 24,987 LF of 8-inch sewer
- Cured-in-place lining of 2,250 LF of 10-inch sewer
- Cured-in-place lining of 339 LF of 12-inch sewer
- Cured-in-place lining of 1020 LF of 15-inch sewer
- Cured-in-place lining of 1625 LF of 24-inch sewer
- Performed 14 dig-in-place spot repairs
- Installed one short liner in a 24-inch sewer
- Installed lateral service connection lining at 474 locations
- Installed full length later service lining at 23 locations
- Grouted 50 lateral service connections
- Installed 6 new sewer manholes
- Replaced 21 sewer service connections
- Replaced 33 brick corbels with HDPE grade rings
- Installed 336 vertical inches of HDPE grade rings in manholes
- Installed 1326 VF of cement/epoxy manhole lining
- Epoxy lined 250 sf of sewer vaults
- Sealed 125 manhole corbels
- Cleaned and CCTV 20,498 LF of main line pipe

Reporting Period Activity: The rehabilitation of the sanitary sewer pump station at Sherman Street was completed.

MWRA I/I Local Financial Assistance Program: The community has financed six (6) I/I reduction projects through the Authority's funding assistance program. Of the \$16,940,900 allotted through the Program's Phases 1 - 13, the community has \$11,438,000 remaining in funding assistance.

### **30. SOMERVILLE: North System**

Background Information:

- Miles of Sewer: 128
- Sewered Population: 81,360
- Three Year (CY16 - CY18) Annual Average I/I: 4.96 mgd
- MassDEP Administrative Actions since 2010: Unilateral Order (September 2010)

Somerville is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Somerville are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Report: Sewer and Combined Sewer CIP (September 2016)

CIP Project 1 - Manhole Inspection, Assessment and Design (March 2018)

CIP Project 2 - Pipeline Inspection, Assessment, and Design (Ongoing)

Private Source Inflow Removal Program: The City is enforcing City Ordinance Chapter 11 (Public Works), Article VII (Sewers), Section 11-165 (roof water, surface water and other drainage). This ordinance gives the City authority to disconnect and prevent roof, surface and other water from entering the collection system in various sections of the City.

I/I Rehabilitation Projects in Design or Construction:

CIP Project 1 Sewer Manhole Rehabilitation: The rehabilitations were designed as part of the CIP Project 1 Manhole Inspection / Assessment and Design Project. A preliminary design of rehabilitations was completed during the reporting phase of the project and detailed within the report titled *CIP Project 1 Manhole Inspection and Assessment (March 2018)*. Work under this project (MWRA Project No. WRA-P11-30-3-1111) includes chemical root treatment of 20 sewer manholes; cementitious lining of sewer manholes (4620 VF); building benches and inverts in 110 sewer manholes; replacing 147 sewer manhole frames and covers; raising and replacing six (5) sewer manhole frames and covers; furnishing and installing 58 sewer manhole inflow dishes; redirecting six (6) sewer manhole access ports; sealing five (5) sewer manhole access ports; sealing underdrain inverts in four (4) sewer manholes; and plugging two (2) underdrain pipe connections. Construction to begin Summer 2019. Warranty retest inspections scheduled for Spring 2020.

15 Year CIP: The field work associated with the CIP Project 1 Manhole Inspection / Assessment and Design Project began in February 2017 and was completed in June 2017. Work included inspecting 4478 manholes and identified 255,024 gpd of infiltration. Manhole rehabilitation design is complete.

The field work associated with the CIP Project 2 Pipeline Inspection & Assessment Project (in the areas of Teele Square, Davis Square and Tufts University) began in April 2018 and is ongoing.

Somerville Avenue Infrastructure and Streetscape Improvement Project: Construction of the three-year project began in May 2018. To date, work has consisted of utility relocations in advance of the installation of the large stormwater box culvert and cleaning of existing sewers in advance of lining.

Bike Path Sewer / Drain Repair:

The rehabilitation of a 24-inch cross-country combined sewer pipe has been put on hold due to the private property impacts and restoration costs. The Engineering Department is currently evaluating options to reroute the line to within City rights-of-way.

Cedar Street Sewer Separation Project: The Cedar Street Sewer Separation Project began in June 2016. Construction is ongoing. The contractor completed the subsurface component of the project in May 2018 including localized sewer separation from Elm Street to Highland Avenue by replacing existing brick combined sewer with 48-inch RCP drain and 12-inch PVC sewer. The contractor is currently completing the surface restoration component of the project. The system currently re-combines in Elm Street. Therefore there is no inflow reduction until future separation work is completed. CCTV inspection to quantify infiltration reduction was not performed; however, given the age of the system, a benefit can be assumed.

Reporting Period Activity: In May 2018, the City formally adopted an Inflow/Infiltration ordinance requiring 4:1 offset of any new or increased flows to the system. The ordinance is more stringent than state guidance and requires the mitigation for any and all increases, although an administrative de minimus exemption is available to internal remodel projects that result in increases less than 330 gpd. To facilitate the program, developers may pay a fee that is deposited to a dedicated I/I reduction account created under the Sewer Enterprise Fund.

MWRA I/I Local Financial Assistance Program: The community has financed ten (10) I/I reduction projects through the Authority's funding assistance program. Of the \$25,955,800 allotted through the Program's Phases 1 - 13, the community has \$13,838,900 remaining in funding assistance.

### **31. STONEHAM: North System**

Background Information:

- Miles of Sewer: 63
- Sewered Population: 21,816
- Three Year (CY16 - CY18) Annual Average I/I: 1.52 mgd
- MassDEP Administrative Actions: None
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-028 (August 2009)

Latest I/I or SSES Report: Infiltration/Inflow Analysis Summary Report (December 2017)

Private Source Inflow Removal Program: Under its NPDES Phase 2 Stormwater permit requirements (MS4), the Town is continuing to investigate and eliminate illicit cross-connections between the sanitary sewer and storm water systems as part of the Illicit Discharge Detection and Elimination Program (IDDE).

The Town has also established a sewer connection fee. The Town is evaluating options for establishing a 4:1 I/I removal program in accordance with recently enacted MA DEP Regulations at 314 CMR 12.

I/I Rehabilitation Projects in Design or Construction:

- Phase 6 / Boston Regional Medical Center (BRMC) Sewer Rehabilitation: Project work is substantially complete. Warranty reinspection work scheduled for Spring 2020 (18-24 months after sewer rehabilitation work).
- Fallon Road / Park Street System Rehabilitation (Phase 1) substantially complete. Completion expected Fall 2020.

Reporting Period Activity: The Town's new administration is evaluating options for establishing a 4:1 I/I removal program in accordance with recently enacted MassDEP Regulations at 314 CMR 12.

Additional Developments for FY19 include the following:

Completed:

Main Street - #380 (Commercial / Residential Condo) = 100%

Adam Road - #7 (Unit 11), Occupied 2019

Adam Road - #10, Occupied 2019

BRMC:

- Sterling Hill Condo = 100% Constructed / Occupied
  - Langwood Commons Apartment = 60% Constructed (First Occupancy Winter 2019).
- Fallon Road – Mave Apartments; 100% Constructed / Occupied

New:

Butler Avenue - 39; Winter 2019

Butler Avenue - 41; Winter 2019

Franklin Street - 139 (3 Units); Fall 2019

Greenview Road - 17; Fall 2019

High Street - 109; Spring 2019

High Street - 113; Summer 2019

High Street - 119; Fall 2019

Plaza Avenue - 14; Winter 2019

Skyewood Drive - 24; Fall 2019  
Tremont Street - 26; Fall 2019  
Tremont Street - 28; Fall 2019  
William Street - 102 (2 Units); Fall 2019

In March 2019, \$970,000 in MWRA grant/loan funds were distributed for the Planning, Design & Construction of Phase 7 Sewer System I/I Rehabilitation in Study Area 4 (MWRA Project No. WRA-P11-31-3-1107). Details of this project are included in Attachment 4.

MWRA I/I Local Financial Assistance Program: The community has financed eleven (11) I/I reduction projects through the Authority's funding assistance program. Of the \$7,829,900 allotted through the Program's Phases 1 - 13, the community has \$1,940,000 remaining in funding assistance.

## **32. STOUGHTON: South System**

### **Background Information:**

- Miles of Sewer: 89
- Sewered Population: 19,112
- Three Year (CY16 - CY18) Annual Average I/I: 1.36 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: Years 9 & 10 Rehabilitation Evaluation (February 2014)  
Years 1 & 2 (Round 2) Sewer System I/I Investigation (November 2015)  
Years 3 & 4 (Round 2) Evaluation (July 2016)  
Reprioritized Year 5 Spring 2017 I/I Investigation (September 2017)  
Reprioritized Year 6 Spring 2018 I/I Investigation (November 2018)  
Year 7 (Round 2) Evaluation (Ongoing)

Private Source Inflow Removal Program: The Town has adopted new sewer use regulations which address private inflow removal. TV inspection of service connections / house-to-house inspections is ongoing.

### **I/I Rehabilitation Projects in Design or Construction:**

Years 3, 4 and 5 Construction Design (Stoughton Contract 18-1 / MWRA Project No. WRA-P9-32-3-982) complete March 2018. Construction began in August 2018 (MWRA Project Nos. RA-P9-32-3-995 / 1120). Project work substantially complete February 2019. Warranty retesting work scheduled for Spring 2020. Project to remove an estimated 0.075 mgd of peak infiltration and 0.079 mgd of peak inflow.

Years 1 & 2 Infiltration Rehabilitation Construction (Stoughton Contract 16-1 / MWRA Project No. WRA-P9-32-3-935) is complete with warranty retesting work completed July 2018.

### **Reporting Period Activity:**

Reprioritized Year 7 Spring 2019 I/I Investigation (MWRA Project No. WRA-P9-32-3-995) completed Spring 2019. Data review/report preparation to be complete Fall 2019.

Reprioritized Year 6 Spring 2018 I/I Investigation (MWRA Project No. WRA-P9-32-3-982) completed Spring 2018. Data review/report preparation completed November 2018. Investigation identified 0.096 mgd of peak removable infiltration and 0.005 mgd of peak removable inflow.

Sewer extension of approximately 3000 LF at Forest Green by private developer is ongoing. Sewer extension of approximately 9000 LF off Daly Drive by private developer is ongoing.

MWRA I/I Local Financial Assistance Program: The community has financed fifteen (15) I/I reduction projects through the Authority's funding assistance program. Of the \$7,902,900 allotted through the Program's Phases 1 - 13, the community has \$2,650,000 remaining in funding assistance.

### **33. WAKEFIELD: North System**

#### Background Information:

- Miles of Sewer: 93
- Sewered Population: 27,067
- Three Year (CY16 - CY18) Annual Average I/I: 2.70 mgd
- MassDEP Administrative Actions: None

#### Latest I/I or SSES Report:

2014 Smoke Testing Program - Gauging Areas 6 & 7 of Subarea 6 (January 2015)  
2015 Smoke Testing Program - Sewer Subarea 2 (June 2016)  
TV Inspection & Cleaning of Areas to be Paved (August 2016)  
Sewer System Evaluation Survey - Year One (February 2017)  
Sewer System Evaluation Survey - Year Two (December 2017)  
Sewer System Evaluation Survey - Year Three (January 2019)  
Sewer System Evaluation Survey - Year Four (Ongoing)

Private Source Inflow Removal Program: The Town is developing a plan to notify residents in the Paon Boulevard area of a potential pilot building inspection program as this area is being investigated for potential inflow sources.

I/I Rehabilitation Projects in Design or Construction: Television inspection and manhole inspections for approximately 50,000 LF for the Sewer System Evaluation Survey - Year Three was completed and report was provided to the Town in January 2019. This project identified 115,000 gpd of removable peak I/I and structural defects in select areas that are scheduled to be paved within the next few calendar years. Construction of these recommended repairs is scheduled for the Winter 2019/2020.

Television inspection and manhole inspections for approximately 100,000 LF for the Sewer System Evaluation Survey - Year Four is currently ongoing. This project goal is to identify I/I and structural defects in select areas that are scheduled to be paved within the few calendar years.

Construction of recommended repairs identified in the Sewer System Evaluation Survey -Year Two was completed in Spring 2019. This project is estimated to have removed approximately 50,000 gpd of peak infiltration while repairing approximately 10,000 LF of sewer mains and 70 sewer manholes.

Reporting Period Activity: The Town continues to require a 4 to 1 removal of flow from completed subdivisions/developments. Also, the Town implemented a \$500 Sewer Connection Fee in June 2019.

The Town approved a 215 LF gravity sewer extension on Lovis Avenue to support four new single family home connections in Fall 2018.

In December 2018, \$526,410 in MWRA grant/loan funds were distributed for the following project: Construction of Recommended Sewer Rehabilitations from Year 2 Sewer System Evaluation Survey. The estimated I/I removal from this project is 0.05 mgd annually (MWRA Project No. WRA-P9-33-3-997). Details of this project are included in Attachment 4.

MWRA I/I Local Financial Assistance Program: The community has financed twenty-six (26) I/I reduction projects through the Authority's funding assistance program. Of the \$9,806,900 allotted through the Program's Phases 1 - 13, the community has \$3,313,590 remaining in funding assistance.

### **34. WALPOLE: South System**

#### Background Information:

- Miles of Sewer: 59
- Sewered Population: 18,303
- Three Year (CY16 - CY18) Annual Average I/I: 0.85 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: I/I Investigation Program: Year 7 (January 2014)  
I/I Investigation Program: Year 8 (February 2016)  
I/I Investigation Program (Round 2): Year 1 (January 2017)  
I/I Investigation Program (Round 2): Year 2 (January 2018)  
I/I Investigation Program (Round 2): Year 3 (November 2018)  
I/I Investigation Program (Round 2): Year 4 (Ongoing)

Private Source Inflow Removal Program: The Town includes house-to-house private inflow inspection program as part of its water meter replacement program. For new connections greater than 15,000 gpd, a 4 to 1 reduction as per 314 CMR 12.04 is required. For new connections less than 15,000 gpd, developers are required to remove I/I at a ratio of 2.3 to 1 (developers may pay the town \$13.60 per gallon should they so choose).

I/I Rehabilitation Projects in Design or Construction: The 2019 Sewer System Improvement Project is currently being designed. This project will incorporate the last four years of sewer system investigation reports (Year 8; Round 2, Year 1; Round 2, Year 2; and Round 2, Year 3). Construction advertisement is planned for August 2019.

Reporting Period Activity: Year 3 I/I Investigation (Round 2) work completed Spring 2018. Data review/report preparation completed November 2018. Approximately 17,136 gpd of peak infiltration was observed during television inspection and 8496 gpd of peak infiltration was identified during manhole inspection.

The Year 4 I/I Investigation (Round 2) work was completed Spring 2019. Data review and reporting is ongoing.

Year 2 I/I Investigation (Round 2) work completed Spring 2017. Data review/report preparation completed January 2018. Television inspection revealed an estimated 29,664 gpd of peak infiltration. Topside manhole inspection revealed an estimated 29,088 gpd of peak infiltration.

A total of 1860 LF of 8-inch sewer main has been added to Walpole's system over the past year. A private developer I/I mitigation project as an obligation to the Town of Walpole is under contract.

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the \$6,110,000 allotted through the Program's Phases 1 - 13, the community has \$3,068,000 remaining in funding assistance.

### **35. WALTHAM: North System**

#### Background Information:

- Miles of Sewer: 138
- Sewered Population: 61,580
- Three Year (CY16 - CY18) Annual Average I/I: 3.28 mgd
- MassDEP Administrative Actions since 2010: ACOP-NE-10-1N001 (February 2010)

#### Latest I/I or SSES Report:

Inflow & Infiltration Improvements Section 5C (Lexington St - Trapelo Rd to Town Line) (March 2014)  
Inflow & Infiltration Analysis Sewer System Section 12A-2 Lakeview Area (July 2014)  
Inflow & Infiltration Improvements Phase 5.1, Section 6B6 - Pond End Lane Area (August 2014)  
Post Flow Metering Report - Area 13/14-A SSO Mitigation Project (June 2016)  
Post Flow Metering Report - Area 12-A -2-3 Lakeview (June 2016)  
Post Flow Metering Report - Area 6B6 - Pond End Lane (July 2016)  
Post Flow Metering Report - Alderwood Road Area (July 2016)  
Area 13/14B – Sewer System Evaluation Survey (February 2018)

Private Source Inflow Removal Program: Updates for FY19 include:

- Roof Drain removed 34 Cabot Street = 5623 gpd
- Sump Pump removed at 76 Cabot Street = 1200 gpd
- Sump Pump removed at 47 Woodland Drive = 1200 gpd
- Sump Pump removed at 100 Woodland Drive = 1200 gpd
- July - December 2018: 15 sewer laterals totaling 219 LF; estimated removal 67 gpd
- January - June 2019: 20 sewer laterals totaling 394 LF; estimated removal 101 gpd

I/I Rehabilitation Projects in Design or Construction:

- Beaver Street Area 5A: Final SSES report/result due August 2019
- West End Area - 13/14 B-1 Sewer Rehabilitation Project under construction: Summer/Fall 2019
- Bear Hill Valley Area 13/14 - 2 Sewer Rehabilitation Project: Bid Winter 2020
- Lexington Street & School Street: Heavy cleaning sewers (1350 LF) in vicinity of intersection

Reporting Period Activity: Lexington Street Sewer Improvements: Replaced 620 LF of 10-inch diameter VC sewer main with 15-inch diameter PVC sewer main from No. 725 Lexington Street (YMCA) to Lake Street.

School Street Sewer Improvements: Replaced 256 LF of 8-inch diameter VC sewer main with 8-inch diameter PVC sewer.

In June 2019, \$3,849,500 in MWRA grant/loan funds were distributed for the Sewer Area 13 / 14B Sewer and Manhole Rehabilitation Project. The estimated I/I removal from this project is 0.03 mgd annually (MWRA Project No. WRA-P11-35-3-1106). Details of this project are included in Attachment 4.

MWRA I/I Local Financial Assistance Program: The community has financed nine (9) I/I projects through the Authority's funding assistance program. Of the \$22,282,400 allotted through the Program's Phases 1 - 13, the community has \$7,055,500 remaining in funding assistance.

## **36. WATERTOWN: North System**

Background Information:

- Miles of Sewer: 75
- Sewered Population: 34,612
- Three Year (CY16 - CY18) Annual Average I/I: 1.28 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: TV Inspection Subsystem 7 and Sewer Rehabilitation (2016)

Additional TV Inspection Subsystem 7 and Sewer Rehabilitation (2017)

CIP 1 - Sewer Rehabilitation Subareas 1 and 9 (March 2019)

CIP 1 - Sewer Rehabilitation Subareas 6 and 7: Howard Street (March 2019)

CIP 1 - Sewer Rehabilitation Subareas 2, 14, 18 and Arsenal Street (March 2019)

Private Source Inflow Removal Program: In May, 2018, a catch basin at No. 70 School Street was disconnected from the sewer system and reconnected to the drain system.

I/I Rehabilitation Projects in Design or Construction: The Sanitary Sewer Rehabilitations (Contract 18-01S) is currently ongoing. Warranty re-test inspection and project closeout is scheduled for Summer/Fall 2019. Based on the 2017 Sewer Rehabilitations Report (December 2017), approximately 8568 gpd of infiltration will be removed from Watertown's sanitary sewer collection system. As part of the project 12,302 LF of sewer and drain was cleaned and television inspected. Weston & Sampson reviewed the television inspection and identified 2736 gpd of peak infiltration scheduled to be rehabilitated during a future construction project(s).

Completed CIP Project 1 - Subareas 1 and 9 Inspection and Assessment, which included 38,734 LF of sewer and 222 sewer manholes. The estimated I/I removal is 19,656 gpd of peak infiltration and 11,378 gpd of peak inflow.

Completed CIP Project 1 - Subareas 6 and 7 (Howard Street) Inspection and Assessment, which included 24,941 LF of television inspection and 141 sewer manholes. The estimated I/I removal is 13,732 gpd of peak infiltration and 13,110 gpd of peak inflow.



Completed CIP Project 1 - Subareas 2, 14, 18, and Arsenal Street Inspection and Assessment, which included 19,137 LF of sewer and 126 sewer manholes. The estimated I/I removal is 6,768 gpd of peak infiltration and 90,918 gpd of peak inflow.

Completed cleaning and television inspection of approximately 4000 LF of sewer in various locations throughout town.

CIP Project 1 Rehabilitations (Contract 19-01S) is currently in the public bidding process; the bid opening is scheduled for July 3, 2019. The project includes rehabilitations identified during CIP Project 1 Inspection and Assessment projects.

CIP Project 1A Rehabilitations is currently in the design phase and is scheduled to be bid upon completion of CIP Project 1 Rehabilitations.

Reporting Period Activity: Completed the 2017 Drain and Sewer Replacement project on Arden Road and Maplewood Road. The sewer scope included approximately 1500 LF of sewer replacement, 33 sewer service connections, eight (8) sewer manholes and cementitious lining of two (2) sewer manholes.

In March 2019, \$1,050,000 in grant/loan funds were distributed for CIP Project 1: I/I Investigation & Rehabilitation Program (MWRA Project No. WRA-P11-36-3-1109). Details of this project are included in Attachment 4.

MWRA I/I Local Financial Assistance Program: The community has financed nine (9) I/I investigation projects through the Authority's funding assistance program. Of the \$10,155,800 allotted through the Program's Phases 1 - 13, the community has \$4,920,000 remaining in funding assistance.

## **37. WELLESLEY: South System**

Background Information:

- Miles of Sewer: 134
- Sewered Population: 28,801
- Three Year (CY16 - CY18) Annual Average I/I: 1.55 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: I/I Analysis and Flow Metering Program (April 2019)

Private Source Inflow Removal Program: Based upon previous private source inflow studies, DPW is contacting the owners of identified illegal sump pumps. To date, 18 sump pumps have been removed from the sanitary system. Also, the Town continues to pursue illegal sump pump connections identified through the water meter ERT Battery Change-out Transaction Program.

I/I Rehabilitation Projects in Design or Construction:

During FY19/20, Sewer System Inspection and Rehabilitation work consisted of 16,337 LF of sewer main cleaning and TV inspection, 3482 joints tested, 404 joints sealed with grout and 769 VF of brick manholes were sealed. The Town also flushed 158,144 LF of sewer main and rodded 3620 LF of sewer main and 329 sewer laterals.

McLean Street Sewer Repair (MWRA Project No. WRA-P9-37-3-986) work consisted of the replacement of 200 LF of existing 10-inch VC pipe with 10-inch HDPE pipe via pipe bursting. Work on McLean Street was located between Willow Street and Ashmont Road. An estimated 0.01 mgd of peak infiltration was removed from the collection system.

Sewer System Inspection and Rehabilitation (Contract No. 13C-460-1564 / MWRA Project No. WRA-P9-37-3-986) work consisted of chemical root treatment of 6975 LF of sewer; testing 6995 joints and sealing/retesting 2371 joints; installing 21 LF of CIP short liners; testing & sealing 13 LF of service connections and sealing 388 VF of manholes. An estimated 0.03 mgd of peak infiltration was removed from the collection system.

Worcester Street (Route 9) Sewer Repair (Contract No. 17C-460-1581 / MWRA Project No. WRA-P9-37-3-986) work consisted of a spot repair of six LF of existing 10-inch VC pipe with 10-inch PVC pipe. Work on Route 9 was located between Rockland Street and No. 504 Worcester Street. An estimated 0.01 mgd of peak infiltration was removed from the system.

Cliff Road Sewer Repair (MWRA Project No. WRA-P9-37-3-986) work consisted of the replacement of five (5) LF of existing 8-inch VC pipe with 8-inch PVC pipe via open cut. Work on Cliff Road was located between Pierce Road and No. 206 Cliff Road. An estimated 0.01 mgd of peak infiltration was removed from the collection system.

Reporting Period Activity: A wastewater flow metering program (conducted April 11 - June 20, 2018) utilizing 38 flow meters was completed. Through the I/I Analysis development, approximately 3.40 mgd of total peak infiltration exists in the community system. Peak design storm inflow (for the 5-year, 24-hour storm) was calculated to be approximately 13.5 mgd. Further I/I investigations in the top priority subareas is ongoing.

In FY19, the Town contracted for replacement design of the Lake Road Sewer Lift Station. Pump station replacement construction to be performed in FY20 based on the extended delivery time for the station from the manufacturer.

MWRA I/I Local Financial Assistance Program: The community has financed thirteen (13) I/I reduction projects through the Authority's funding assistance program. Of the \$9,249,700 allotted through the Program's Phases 1 - 13, the community has \$5,667,196 remaining in funding assistance.

### **38. WESTWOOD: South System**

Background Information:

- Miles of Sewer: 77
- Sewered Population: 14,450
- Three Year (CY16 - CY18) Annual Average I/I: 0.88 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: I/I Investigation Program (January 2016)  
FY19 Infiltration Rehabilitation Program (January 2019)

Private Source Inflow Removal Program: A house-to-house inspection survey has been completed. The survey included inspection of 1880 residences and identified 135 suspect sump pumps. Sump pump removal notification letters forthcoming.

I/I Rehabilitation Projects in Design or Construction:

FY19 Infiltration Rehabilitation Program work to be bid Summer 2019.

Phase 1 - I/I Rehabilitation Design/Construction (MWRA Project No. WRA-P9-38-3-949): Design cost-effective and value-effective sewer rehabilitations; prepare construction rehabilitation drawings and specifications for public bidding; and prepare a final cost estimate for the designed rehabilitations. Construct cost-effective and value-effective sewer rehabilitations and perform construction public bid/award/resident project representative services. Sewer rehabilitation work included approximately: Cleaning and TV inspection of 20,000 LF of sewer main; installing 5020 LF of CIP pipe; performing 112 lateral connection repairs; raising 17 manhole frames & covers to grade; replacing three manhole frames & covers and rehabilitating 19 sewer manholes (via cementitious and epoxy lining). Project work was performed in the following areas: Pond Plain Road to Oak Street / Pond Street Fill-in Area / High Street to Oriole Road / Stanford Road to Sunrise Road.

Phase 2 - I/I Investigation (MWRA Project No. WRA-P9-38-3-949): Cleaning, TV inspection, videotaping and recording 15,000 LF of sewer main and performing topside manhole inspections of 75 sewer manholes. Project work performed in the following areas: School Street Area / Hartford Street Fill-in Area / Lake Shore Drive to High Street / Lake Shore Drive to Arcadia Road / Sycamore Drive to Arcadia Road.

Reporting Period Activity: Construction of large retail/residential development on University Avenue is ongoing. The project involves installation of new 6 and 8-inch PVC sewer mains throughout the development. Extension of an 8-inch PVC sewer line on Summer Street and Grove Street for approximately 1600 LF completed (will add five additional services to the sanitary system).

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the \$4,302,300 allotted through the Program's Phases 1 - 13, the community has \$2,211,000 remaining in funding assistance.

### **39. WEYMOUTH: South System**

#### Background Information:

- Miles of Sewer: 238
- Sewered Population: 55,123
- Three Year (CY16 - CY18) Annual Average I/I: 4.77 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report: Town-Wide Sewer Investigation - Year 5 (December 2016)  
Town-Wide Sewer Investigation - Year 6 (January 2016)  
Town-Wide Sewer Investigation - Year 7 (October 2018)  
Town-Wide Sewer Investigation - Year 8 (Ongoing)

Private Source Inflow Removal Program: The Town has completed the redirection of 330 sump pumps (for an estimated 165,000 gpd of inflow removal). Six (6) sump pumps were redirected during FY13-19.

#### I/I Rehabilitation Projects in Design or Construction:

Year 6 Design complete August 2018 (MWRA Project No. WRA-P9-39-3-978). Year 6 Construction complete March 2019 (MWRA Project No. WRA-P9-39-3-989). Rehabilitation construction resulted in the removal of approximately 0.045 mgd of infiltration and 0.039 mgd of peak design storm inflow.

The Year 5 Sewer System Infiltration Rehabilitation Design Project (MWRA Project No. WRA-P9-39-2-965) was completed in October 2017. Year 5 Rehabilitation Construction (Weymouth Contract No. PW-17-003-S / MWRA Project No. WRA-P9-39-3-978) completed May 2018. Project work was performed in Subareas B-1 / B-4. Work included 2964 LF of cleaning and TV inspection; 9847 LF of cleaning, inspecting, testing and sealing; root treatment of 2986 LF of sewer main and one (1) manhole; installing 2297 LF of CIP pipe and 74 LF of CIP short liners; testing and grouting 25 service connections; cementitious lining of nine manholes (95 VF); furnishing and installing eight (8) manhole frames and covers; furnishing and installing eleven (11) manhole inflow dishes; and performing one (1) open cut point repair. Approximately 0.04 mgd of infiltration and 0.10 mgd of peak design storm inflow was removed through this project.

Reporting Period Activity: The Year 8 Investigation is currently ongoing. Field investigations were completed Spring 2019. Data review/report preparation is ongoing.

The Year 7 Investigation was completed in October 2018. The investigation identified approximately 0.155 mgd of infiltration and 0.017 mgd of peak design storm inflow. Rehabilitation design (based on the Year 7 report recommendations) is scheduled to begin August 2019 (MWRA Project No. WRA-P11-39-3-1125). Approximately 0.136 mgd of infiltration and 0.017 mgd of peak design storm inflow will be removed through construction.

The Year 6 Town-Wide Investigation Program (MWRA Project No. WRA-P9-39-2-965) began March 2017 (Subarea C-8) and was completed May 2017. Data review/report preparation was completed January 2018. The investigation identified approximately 0.09 mgd of peak infiltration and 0.04 mgd of peak design storm inflow. Rehabilitation design (based on the Year 6 report recommendations) is currently ongoing with an anticipated bid opening of Fall 2018. Approximately 0.06 mgd of infiltration and 0.04 mgd of peak design storm inflow will be removed through rehabilitation construction.

MWRA I/I Local Financial Assistance Program: The community has financed eighteen (18) I/I reduction projects through the Authority's funding assistance program. Of the \$19,100,900 allotted through the Program's Phases 1 - 13, the community has \$9,675,000 remaining in funding assistance.

### **40. WILMINGTON: North System**

#### Background Information:

- Miles of Sewer: 29
- Sewered Population: 4,880
- Three Year (CY16 - CY18) Annual Average I/I: 0.63 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: Infiltration/Inflow Analysis Report (December 2017)

Private Source Inflow Removal Program: Town continuing inspections on an as-needed basis.

I/I Rehabilitation Projects in Design or Construction: See below.

Reporting Period Activity: Based on the studies performed in 2018, the Town entered into a contract with Arcadis for the design and construction of Sewer System Rehabilitation within I/I Sub-Areas 5 and 8 (MWRA Project No. WRA-P11-40-3-1118).

There is an ongoing development proposal for repurposing of No. 220 Main Street for a new car wash. Arcadis completed a capacity assessment for this project.

There is an ongoing development proposal for new residential townhouses at No. 635 Main Street. The receiving sewer mains on Main Street were cleaned and CCTV'd and Arcadis completed a condition assessment and capacity assessment for this project.

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the \$4,232,000 allotted through the Program's Phases 1 - 13, the community has \$2,198,000 remaining in funding assistance.

## **41. WINCHESTER: North System**

Background Information:

- Miles of Sewer: 83
- Sewered Population: 22,824
- Three Year (CY16 - CY18) Annual Average I/I: 1.20 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: Stowell & Marshall Road Sewer System Evaluation (January 2014)  
Sewer System Evaluation Survey (SSES) Phase II (November 2016)

Private Source Inflow Removal Program: The Town's Private Inflow Source Removal Program is ongoing. No additional sump pumps were removed from the sewer system during this period.

I/I Rehabilitation Projects in Design or Construction: The Phase II Sanitary Sewer Rehabilitations (Part A) began in May 2019 and is scheduled to be completed in August 2019.

The Phase II Sanitary Sewer Rehabilitations (Part B) design will begin in Fall 2019. Construction is scheduled to begin in Spring 2020. The Phase II Sanitary Sewer Rehabilitations (Part B) will remove an estimated 62,319 gpd of infiltration and 17,301 gpd of inflow.

Reporting Period Activity: The Town will be requesting \$1,750,000 in MWRA funding assistance in August 2019 for the Phase II Sanitary Sewer Rehabilitations (Part B) Project.

MWRA I/I Local Financial Assistance Program: The community has financed nine (9) I/I reduction projects through the Authority's funding assistance program. Of the \$6,793,000 allotted through the Program's Phases 1 - 13, the community has \$2,610,000 remaining in funding assistance.

## **42. WINTHROP: North System**

Background Information:

- Miles of Sewer: 36
- Sewered Population: 18,625
- Three Year (CY16 - CY18) Annual Average I/I: 1.04 mgd
- MassDEP Administrative Actions since 2010: NON – May 2018 Failed to submit I/I Analysis (due 12/31/17)

Latest I/I or SSES Report: Sewer System I/I Assessment (April 2014)  
Flow Monitoring Program (March-May 2019)  
I/I Analysis Report (October 2019)

Private Source Inflow Removal Program: The DPW, in partnership with the Town's Building and Plumbing Inspectors, continues to actively seek out illegal sump pump connections to the Town's sewer system.

Based on the results I/I Analysis conducted in 2019, smoke testing, dye testing and building inspections are anticipated to be scheduled in the July - September 2020 time period.

I/I Rehabilitation Projects in Design or Construction: Design of Town Center Improvements - Design of improvements to upgrade sewer mains on Woodside Avenue, Somerset Avenue, Bartlett Road, Adams Street, Williams Street and Cottage Park Avenue continues to be ongoing. Changes in project scope and funding concerns have slowed design progress for this project. Construction for the project is anticipated to begin in the next 18 months.

Reporting Period Activity: Flow metering was performed in spring of 2019. The data is in the process of being analyzed. A summary report is scheduled for October 2019. It is anticipated that flow isolation and video inspection will be performed in the March - June 2020 time period.

In March 2019, \$259,500 in MWRA grant/loan funds were distributed for a Town-Wide Wastewater Flow Monitoring and I/I Analysis in compliance with 314 CMR 12.04(2) (MWRA Project No. WRA-P11-42-1-1110). Details of this project are included in Attachment 4.

MWRA I/I Local Financial Assistance Program: The community has financed eleven (11) I/I reduction projects through the Authority's funding assistance program. Of the \$5,553,400 allotted through the Program's Phases 1 - 13, the community has \$2,486,500 remaining in funding assistance.

### **43. WOBURN: North System**

Background Information:

- Miles of Sewer: 141
- Sewered Population: 38,867
- Three Year (CY16 - CY18) Annual Average I/I: 2.61 mgd
- MassDEP Administrative Actions since 2010: None

Latest I/I or SSES Report:

CIP Smoke Testing - Project 1 Final Report (February 2014)  
CIP Project 1 - Sewer Investigation and Evaluation Final Report (March 2014)  
CIP Project 2 - Sewer Investigation and Evaluation Final Report (February 2015)  
CIP Project 3 - Sewer Investigation and Evaluation Final Report (April 2016)  
CIP Project 4 - Sewer Investigation and Evaluation Final Report (March 2017)

Private Source Inflow Removal Program: Under the MassDEP 2005 ACO, a 10:1 flow reduction is required. No removal activity occurred during this period.

I/I Rehabilitation Projects in Design or Construction: CIP Project 2 Rehabilitations warranty retesting work was completed Spring 2019. CIP Project 3 Rehabilitations are currently being designed with completion expected by August 2019.

Reporting Period Activity: In March 2019, \$1,990,000 in MWRA grant/loan funds were distributed for Construction of Recommended Sewer Rehabilitations in CIP Project Area 3 (MWRA Project No. WRA-P11-43-3-1108). Details of this project are included in Attachment 4.

MWRA I/I Local Financial Assistance Program: The community has financed thirteen (13) I/I reduction projects through the Authority's funding assistance program. Of the \$16,665,500 allotted through the Program's Phases 1 - 13, the community has \$3,980,000 remaining in funding assistance.

ATTACHMENT 6  
TO  
MWRA ANNUAL I/I REDUCTION REPORT FOR FY19  
Reporting Period – July 2018 Through June 2019

**CY18 COMMUNITY WASTEWATER FLOW DATA**

This attachment contains calendar year 2018 wastewater flow data for the 43 MWRA member sewer communities. There are four separate data tables as detailed below.

TABLE 1 (one page - page number 2) presents the CY18 MWRA Wastewater Metering System Community Flow Estimates. This data is monthly total wastewater flow estimates for each of the 43-member sewer communities derived from MWRA's wastewater metering system. Each community's percent share average daily flow and percent share maximum month flow are used as components of MWRA's annual wholesale sewer charge.

TABLE 2 (one page - page number 3) presents the CY18 MWRA Community Wastewater Flow Component Estimates. This data is developed through an engineering analysis by MWRA staff to estimate wastewater flow components, including: dry day average daily flow, average daily infiltration, average daily sanitary flow, and average daily inflow. The data in TABLE 2 is annual data. The percent share for each estimated flow component is also presented. The data presented in TABLE 2 is a summary of the more detailed monthly flow component analysis presented in TABLE 4. The estimated average daily sanitary flow (non-I/I flow) includes: residential, commercial, industrial, and institutional flows.

TABLE 3 (one page - page 4) presents the CY18 Community Wastewater Flow Component Estimates with additional information based on estimated community inch-diameter-miles of sewer.

TABLE 4 (13 pages - page numbers 5 through 17) presents the Estimated Community Wastewater Flow Components for CY18. This data is developed through an engineering analysis by MWRA staff of each community's monthly wastewater flow (derived from MWRA's wastewater metering system) to estimate flow components, including: dry day average daily flow, average daily infiltration, average daily sanitary flow, and average daily inflow. The data listed as MWRA Estimated Infiltration is a calculated estimate of the infiltration entering MWRA-owned sewers that are upstream of wastewater flow meters within a community. The calculation is a weighted allocation of the Raw Estimated Infiltration to the portion of the sewer system that is MWRA-owned versus community-owned. The weighted allocation is based on inch-diameter-miles of MWRA-owned and community-owned sewer. The data presented in TABLE 4 is also presented in TABLE 2 as an annual summary.

TABLE 1 - CY18 MWRA WASTEWATER METERING SYSTEM COMMUNITY FLOW ESTIMATES

01-Aug-19

Community	Total Population	Sewered Population	CY18 Average Daily Flow (ADF) By Calendar Month (MGD)												12 Average Daily Flow (MGD)	Percent Average Daily Flow	Max. Month ADF (MGD)	Percent Max. Month ADF
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
Arlington	45,052	45,016	5.09	5.93	7.68	6.97	5.06	3.59	3.25	3.20	3.46	3.97	9.08	6.44	5.30	1.5%	9.08	1.7%
Ashland	17,684	13,617	1.41	1.55	1.74	1.53	1.23	1.03	1.00	1.07	1.11	1.21	1.90	1.50	1.35	0.4%	1.90	0.4%
Bedford	14,411	14,397	2.55	2.93	3.71	3.67	2.81	2.09	1.86	1.89	1.97	1.97	3.86	3.33	2.72	0.8%	3.86	0.7%
Belmont	26,171	25,778	3.20	3.82	5.50	4.66	3.02	2.03	2.00	2.07	2.05	2.75	6.34	3.96	3.44	1.0%	6.34	1.2%
BWSC	673,184	671,838	99.95	93.77	116.64	107.04	85.71	80.33	82.61	87.57	93.16	91.51	148.25	97.81	98.64	28.5%	148.25	27.4%
Braintree	37,297	37,036	9.05	9.85	12.97	9.68	7.40	5.19	4.50	4.27	5.93	7.94	15.12	9.87	8.46	2.4%	15.12	2.8%
Brookline	59,126	59,067	9.16	9.73	13.07	12.15	8.73	6.39	6.58	6.42	7.29	7.84	16.57	10.44	9.52	2.7%	16.57	3.1%
Burlington	26,351	25,771	3.86	4.50	5.40	5.33	4.05	3.07	2.69	2.71	2.93	3.20	5.59	4.55	3.98	1.1%	5.59	1.0%
Cambridge	110,651	110,629	17.65	18.36	21.49	20.53	18.17	16.90	17.96	19.82	19.47	18.11	26.24	17.52	19.34	5.6%	26.24	4.8%
Canton	22,952	15,724	3.97	4.03	5.21	4.09	3.17	2.31	2.19	2.30	2.92	3.24	5.24	3.59	3.52	1.0%	5.24	1.0%
Chelsea	38,599	38,599	5.88	6.10	8.36	6.64	4.92	4.91	4.85	5.30	5.57	5.31	8.52	5.60	5.99	1.7%	8.52	1.6%
Dedham	25,263	24,379	4.79	5.27	7.18	5.94	4.14	2.79	2.40	2.48	2.82	3.66	7.14	5.00	4.46	1.3%	7.18	1.3%
Everett	44,840	44,840	6.20	6.09	7.62	6.40	5.38	5.00	5.21	5.45	5.65	5.84	9.50	6.65	6.25	1.8%	9.50	1.8%
Framingham	71,594	68,759	7.65	8.83	10.43	9.65	7.91	6.33	6.17	6.63	7.13	7.52	11.18	8.59	8.16	2.4%	11.18	2.1%
Hingham	7,708	7,169	1.67	1.81	2.52	1.66	1.36	0.93	0.80	0.74	0.95	1.44	2.98	1.81	1.55	0.4%	2.98	0.6%
Holbrook	11,022	9,876	1.00	1.16	1.47	1.19	0.95	0.76	0.79	0.78	0.74	0.98	1.50	1.13	1.04	0.3%	1.50	0.3%
Lexington	33,410	32,942	5.04	6.27	8.47	8.30	6.19	3.33	3.65	3.39	3.71	4.72	9.65	7.34	5.83	1.7%	9.65	1.8%
Malden	60,840	60,536	9.61	10.47	13.06	10.70	8.62	7.54	7.33	7.93	7.16	7.88	14.97	10.43	9.63	2.8%	14.97	2.8%
Medford	57,213	57,156	7.83	8.94	12.19	10.57	7.71	5.88	5.30	6.17	6.67	7.00	13.99	8.67	8.40	2.4%	13.99	2.6%
Melrose	27,928	27,922	4.69	5.10	6.89	6.06	4.24	3.00	2.72	3.03	3.27	3.85	9.26	5.90	4.83	1.4%	9.26	1.7%
Milton	27,351	26,695	4.22	4.63	6.40	4.84	3.39	2.16	1.88	2.00	2.54	3.35	7.69	4.67	3.97	1.1%	7.69	1.4%
Natick	36,137	32,100	2.88	3.38	4.38	3.93	3.02	2.34	2.21	2.42	2.50	2.82	4.81	3.76	3.20	0.9%	4.81	0.9%
Needham	30,755	29,125	3.87	4.54	6.36	5.53	4.20	3.06	2.63	2.81	3.06	3.68	7.27	5.05	4.33	1.2%	7.27	1.3%
Newton	89,045	88,057	14.81	16.90	23.77	21.57	16.15	11.11	9.63	9.82	9.84	12.17	28.08	21.24	16.24	4.7%	28.08	5.2%
Norwood	29,097	28,940	7.29	7.93	11.29	8.92	6.18	4.55	4.04	4.18	5.75	6.71	12.16	8.11	7.25	2.1%	12.16	2.2%
Quincy	93,688	93,688	15.02	15.69	21.77	16.29	13.76	11.55	10.84	10.83	12.38	13.90	22.84	15.87	15.05	4.3%	22.84	4.2%
Randolph	33,610	33,543	4.46	4.74	7.05	5.09	3.89	2.90	2.49	2.35	2.84	3.75	6.64	4.61	4.23	1.2%	7.05	1.3%
Reading	25,834	25,395	3.13	3.67	5.27	5.04	3.73	2.36	2.05	2.27	2.59	3.03	5.89	4.54	3.63	1.0%	5.89	1.1%
Revere	53,157	52,918	6.88	7.16	8.97	7.09	6.03	4.85	5.05	6.39	6.45	6.86	10.86	6.96	6.96	2.0%	10.86	2.0%
Somerville	81,322	81,322	11.15	12.34	16.28	14.14	9.48	8.67	9.25	10.75	10.18	11.14	15.91	9.50	11.55	3.3%	16.28	3.0%
Stoneham	21,953	21,668	3.01	3.60	4.93	4.59	3.35	2.35	2.11	2.56	2.73	2.77	6.81	4.52	3.61	1.0%	6.81	1.3%
Stoughton	28,431	20,231	3.64	4.24	6.04	5.08	3.71	2.59	2.12	1.99	2.52	3.47	5.78	4.29	3.78	1.1%	6.04	1.1%
Wakefield	26,753	26,665	4.23	5.29	7.26	6.76	4.80	3.18	2.83	3.21	3.40	3.87	8.54	6.31	4.97	1.4%	8.54	1.6%
Walpole	25,125	18,341	2.30	2.49	3.32	2.96	2.22	1.59	1.54	1.79	2.02	2.31	3.57	2.89	2.41	0.7%	3.57	0.7%
Waltham	63,002	62,114	9.35	10.47	13.60	12.29	9.85	7.68	7.41	7.29	8.06	8.63	14.15	11.21	9.99	2.9%	14.15	2.6%
Watertown	34,025	34,025	3.81	4.32	5.60	4.89	3.61	2.75	2.60	2.63	2.89	3.20	6.41	4.45	3.92	1.1%	6.41	1.2%
Wellesley	29,215	28,485	3.41	3.96	5.73	5.23	3.68	2.46	2.15	2.30	2.65	3.12	6.46	4.51	3.80	1.1%	6.46	1.2%
Westwood	15,279	14,255	2.19	2.34	2.85	2.46	1.89	1.38	1.16	1.20	1.41	1.75	3.39	2.34	2.03	0.6%	3.39	0.6%
Weymouth	55,972	54,366	10.82	11.45	15.33	12.12	9.13	6.67	6.00	5.64	7.39	9.82	17.03	11.50	10.23	3.0%	17.03	3.1%
Wilmington	23,570	4,834	1.46	1.58	1.88	2.00	1.44	1.30	1.24	1.38	1.40	1.47	1.95	1.58	1.56	0.4%	2.00	0.4%
Winchester	22,808	22,794	2.40	3.04	3.94	3.72	2.65	1.77	1.54	1.54	1.74	1.97	4.70	3.40	2.69	0.8%	4.70	0.9%
Winthrop	18,190	18,190	2.30	2.32	3.01	2.39	2.08	1.97	1.93	1.91	2.10	2.50	3.63	2.49	2.38	0.7%	3.63	0.7%
Woburn	39,452	38,584	6.82	7.75	8.74	7.90	6.48	5.21	4.90	4.79	4.89	5.46	8.19	7.00	6.50	1.9%	8.74	1.6%
Total/Average	2,315,067	2,247,386	339.70	358.34	465.37	407.59	315.49	257.85	251.46	265.27	285.29	307.69	539.64	370.93	346.68	100%	541.32	100%
Logan Airport Monthly Rainfall (in)			4.92	3.77	5.07	4.62	1.90	2.96	4.55	4.65	5.12	3.78	9.26	2.72				

**TABLE 2 - 2018 MWRA COMMUNITY WASTEWATER FLOW COMPONENT ESTIMATES (CY18-12 MONTHS)**

01-Aug-19

					2018 Averages (1)			Components of Average Daily Flow (Estimated) (2)								
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
COMMUNITY	Community Demographics		No. of Connects to MWRA System	Miles of Local Sewers (3)	No. of Meters for Permanent System	Average Daily Flow ADF (MGD)	Percent Average Daily Flow (6)	Selected Dry Day ADF (MGD)	Average Daily Infiltration (MGD)	Infiltration As a % of Average Daily Flow	Average Sanitary Flow (MGD)	Sanitary As a % of Average Daily Flow	Average Daily Inflow (4) (MGD)	Inflow As a % of Average Daily Flow	Peak Month ADF (MGD)	Percent Peak Month ADF (6)
	Total Population	Sewered Population														
Arlington	45,052	45,016	327	106	7	5.30	1.53%	4.76	2.26	42.6%	2.50	47.2%	0.54	10.2%	9.08	1.68%
Ashland	17,684	13,617	2	66	2	1.35	0.39%	1.26	0.46	34.1%	0.80	59.3%	0.09	6.7%	1.90	0.35%
Bedford	14,411	14,397	1	78	4	2.72	0.78%	2.57	1.27	46.7%	1.30	47.8%	0.14	5.1%	3.86	0.71%
Belmont	26,171	25,778	2	78	2	3.44	0.99%	2.97	1.57	45.6%	1.40	40.7%	0.47	13.7%	6.34	1.17%
BWSC (5)	673,184	671,838	255	858	33	98.64	28.45%	82.02	23.52	23.8%	58.50	59.3%	16.62	16.8%	148.25	27.39%
Braintree	37,297	37,036	21	140	8	8.46	2.44%	7.35	4.15	49.1%	3.20	37.8%	1.11	13.1%	15.12	2.79%
Brookline (5)	59,126	59,067	10	111	14	9.52	2.75%	8.08	3.88	40.8%	4.20	44.1%	1.44	15.1%	16.57	3.06%
Burlington	26,351	25,771	1	115	1	3.98	1.15%	3.75	1.75	44.0%	2.00	50.3%	0.23	5.8%	5.59	1.03%
Cambridge (5)	110,651	110,629	127	148	9	19.34	5.58%	16.00	4.50	23.3%	11.50	59.5%	3.34	17.3%	26.24	4.85%
Canton	22,952	15,724	65	62	6	3.52	1.02%	3.11	1.71	48.6%	1.40	39.8%	0.40	11.4%	5.24	0.97%
Chelsea (5)	38,599	38,599	47	41	8	5.99	1.73%	4.73	1.73	28.9%	3.00	50.1%	1.26	21.0%	8.52	1.57%
Dedham	25,263	24,379	30	95	8	4.46	1.29%	3.92	2.12	47.5%	1.80	40.4%	0.54	12.1%	7.18	1.33%
Everett	44,840	44,840	21	57	6	6.25	1.80%	5.56	2.36	37.8%	3.20	51.2%	0.69	11.0%	9.50	1.75%
Framingham	71,594	68,759	2	275	4	8.16	2.35%	7.67	2.87	35.2%	4.80	58.8%	0.49	6.0%	11.18	2.07%
Hingham	7,708	7,169	1	39	1	1.55	0.45%	1.34	0.84	54.2%	0.50	32.3%	0.21	13.5%	2.98	0.55%
Holbrook	11,022	9,876	2	31	2	1.04	0.30%	0.94	0.44	42.3%	0.50	48.1%	0.10	9.6%	1.50	0.28%
Lexington	33,410	32,942	17	170	6	5.83	1.68%	5.38	3.18	54.5%	2.20	37.7%	0.45	7.7%	9.65	1.78%
Malden	60,840	60,536	242	100	6	9.63	2.78%	8.72	3.82	39.7%	4.90	50.9%	0.91	9.4%	14.97	2.77%
Medford	57,213	57,156	74	113	6	8.40	2.42%	7.40	3.20	38.1%	4.20	50.0%	1.00	11.9%	13.99	2.58%
Melrose	27,928	27,922	188	74	5	4.83	1.39%	4.22	2.42	50.1%	1.80	37.3%	0.61	12.6%	9.26	1.71%
Milton	27,351	26,695	56	83	13	3.97	1.15%	3.35	1.95	49.1%	1.40	35.3%	0.62	15.6%	7.69	1.42%
Natick	36,137	32,100	30	135	4	3.20	0.92%	2.96	1.16	36.2%	1.80	56.2%	0.24	7.5%	4.81	0.89%
Needham	30,755	29,125	21	132	2	4.33	1.25%	3.91	2.01	46.4%	1.90	43.9%	0.42	9.7%	7.27	1.34%
Newton	89,045	88,057	52	271	7	16.24	4.68%	14.70	6.90	42.5%	7.80	48.0%	1.54	9.5%	28.08	5.19%
Norwood	29,097	28,940	31	108	6	7.25	2.09%	6.51	4.11	56.7%	2.40	33.1%	0.73	10.1%	12.16	2.25%
Quincy	93,688	93,688	56	202	6	15.05	4.34%	13.46	5.26	35.0%	8.20	54.5%	1.58	10.5%	22.84	4.22%
Randolph	33,610	33,543	2	101	2	4.23	1.22%	3.81	1.91	45.2%	1.90	44.9%	0.42	9.9%	7.05	1.30%
Reading	25,834	25,395	2	96	2	3.63	1.05%	3.36	2.06	56.7%	1.30	35.8%	0.26	7.2%	5.89	1.09%
Revere	53,157	52,918	3	98	2	6.96	2.01%	5.89	2.39	34.3%	3.50	50.3%	1.07	15.4%	10.86	2.01%
Somerville (5)	81,322	81,322	43	128	8	11.55	3.33%	8.42	2.92	25.3%	5.50	47.6%	3.14	27.2%	16.28	3.01%
Stoneham	21,953	21,668	27	63	7	3.61	1.04%	3.17	1.77	49.0%	1.40	38.8%	0.44	12.2%	6.81	1.26%
Stoughton	28,431	20,231	1	88	2	3.78	1.09%	3.44	2.04	54.0%	1.40	37.0%	0.34	9.0%	6.04	1.12%
Wakefield	26,753	26,665	11	93	2	4.97	1.43%	4.54	3.04	61.2%	1.50	30.2%	0.42	8.5%	8.54	1.58%
Walpole	25,125	18,341	1	59	2	2.41	0.70%	2.23	1.03	42.7%	1.20	49.8%	0.18	7.5%	3.57	0.66%
Waltham	63,002	62,114	5	138	4	9.99	2.88%	9.18	3.58	35.8%	5.60	56.1%	0.81	8.1%	14.15	2.61%
Watertown	34,025	34,025	14	75	3	3.92	1.13%	3.53	1.33	33.9%	2.20	56.1%	0.39	9.9%	6.41	1.18%
Wellesley	29,215	28,485	2	134	3	3.80	1.10%	3.44	1.74	45.8%	1.70	44.7%	0.36	9.5%	6.46	1.19%
Westwood	15,279	14,255	3	77	3	2.03	0.59%	1.84	0.94	46.3%	0.90	44.3%	0.18	8.9%	3.39	0.63%
Weymouth	55,972	54,366	19	238	4	10.23	2.95%	9.09	5.39	52.7%	3.70	36.2%	1.13	11.0%	17.03	3.15%
Wilmington	23,570	4,834	2	20	1	1.56	0.45%	1.45	0.65	41.7%	0.80	51.3%	0.11	7.1%	2.00	0.37%
Winchester	22,808	22,794	102	83	7	2.69	0.78%	2.44	1.34	49.8%	1.10	40.9%	0.25	9.3%	4.70	0.87%
Winthrop	18,190	18,190	22	36	4	2.38	0.69%	2.08	0.98	41.2%	1.10	46.2%	0.30	12.6%	3.63	0.67%
Woburn	39,452	38,584	18	141	13	6.50	1.87%	5.91	2.21	34.0%	3.70	56.9%	0.59	9.1%	8.74	1.61%
Totals/Averages	2,315,067	2,247,386	1,958	5,356		346.68	100.00%	300.46	124.76	36.0%	175.70	50.7%	46.16	13.3%	541.32	100.00%

**FOOTNOTES:**

- (1) Figures tabulated using data from the MWRA Wastewater Metering System for Calendar Year 2018.
- (2) Wastewater flow components are estimated through engineering analysis by MWRA staff.
- (3) Miles of Local Sewers are from MWRA's regional collection system database or as reported by the Community and do not include service laterals.
- (4) Average Daily Inflow is calculated as a total inflow over the period of January through December 2018 divided by 365 days. Actual inflow during a specific storm event must be calculated separately.
- (5) Community with combined sewers. Inflow figures include combined flow during storm events tributary to MWRA's WWTP.
- (6) Percent average Daily Flow and Percent Peak Month ADF are the two flow-based components of MWRA's Wholesale Sewer Rate Methodology.

Column Summations: Average Daily Flow (ADF) Column F = I+K+M Average Dry Day Flow Column H = I+K



**TABLE 3 - 2018 Final Community Wastewater Flow Component Estimates**

Community	Sewered Population	Miles of Local Sewers	IDM of Local Sewers	Average Daily Flow ADF (MGD)	Average Annual Infiltration (MGD)	Average Annual Inflow (MGD)	Average Sanitary Flow (MGD)	ADF (GPD Per IDM)	I/I (GPD Per IDM)	Infiltration (GPD Per IDM)	Inflow (GPD Per IDM)	Inflow (GPD Per Sewer Mile)	Average Sanitary (GPD Per Sew. Pop.)
Arlington	45,016	106	954	5.30	2.26	0.54	2.50	5,556	2,935	2,369	566	5,094	56
Ashland	13,617	66	594	1.35	0.46	0.09	0.80	2,273	926	774	152	1,364	59
Bedford	14,397	78	738	2.72	1.27	0.14	1.30	3,686	1,911	1,721	190	1,795	90
Belmont	25,778	78	708	3.44	1.57	0.47	1.40	4,859	2,881	2,218	664	6,026	54
BWSC	671,838	858	14,024	98.64	23.52	16.62	58.50	7,034	2,862	1,677	1,185	19,371	87
Braintree	37,036	140	1,300	8.46	4.15	1.11	3.20	6,508	4,046	3,192	854	7,929	86
Brookline	59,067	111	1,332	9.52	3.88	1.44	4.20	7,147	3,994	2,913	1,081	12,973	71
Burlington	25,771	115	1,150	3.98	1.75	0.23	2.00	3,461	1,722	1,522	200	2,000	78
Cambridge	110,629	148	2,368	19.34	4.50	3.34	11.50	8,167	3,311	1,900	1,410	22,568	104
Canton	15,724	62	567	3.52	1.71	0.40	1.40	6,208	3,721	3,016	705	6,452	89
Chelsea	38,599	41	618	5.99	1.73	1.26	3.00	9,693	4,838	2,799	2,039	30,732	78
Dedham	24,379	95	832	4.46	2.12	0.54	1.80	5,361	3,197	2,548	649	5,684	74
Everett	44,840	57	686	6.25	2.36	0.69	3.20	9,111	4,446	3,440	1,006	12,105	71
Framingham	68,759	275	2,750	8.16	2.87	0.49	4.80	2,967	1,222	1,044	178	1,782	70
Hingham	7,169	39	297	1.55	0.84	0.21	0.50	5,219	3,535	2,828	707	5,385	70
Holbrook	9,876	31	312	1.04	0.44	0.10	0.50	3,333	1,731	1,410	321	3,226	51
Lexington	32,942	170	1,763	5.83	3.18	0.45	2.20	3,307	2,059	1,804	255	2,647	67
Malden	60,536	100	1,000	9.63	3.82	0.91	4.90	9,630	4,730	3,820	910	9,100	81
Medford	57,156	113	1,130	8.40	3.20	1.00	4.20	7,434	3,717	2,832	885	8,850	73
Melrose	27,922	74	641	4.83	2.42	0.61	1.80	7,535	4,727	3,775	952	8,294	64
Milton	26,695	83	747	3.97	1.95	0.62	1.40	5,315	3,440	2,610	830	7,470	52
Natick	32,100	135	1,180	3.20	1.16	0.24	1.80	2,712	1,186	983	203	1,778	56
Needham	29,125	132	1,232	4.33	2.01	0.42	1.90	3,515	1,972	1,631	341	3,182	65
Newton	88,057	271	2,710	16.24	6.90	1.54	7.80	5,993	3,114	2,546	568	5,683	89
Norwood	28,940	108	1,091	7.25	4.11	0.73	2.40	6,645	4,436	3,767	669	6,759	83
Quincy	93,688	202	2,020	15.05	5.26	1.58	8.20	7,450	3,386	2,604	782	7,822	88
Randolph	33,543	101	1,138	4.23	1.91	0.42	1.90	3,717	2,047	1,678	369	4,158	57
Reading	25,395	96	864	3.63	2.06	0.26	1.30	4,201	2,685	2,384	301	2,708	51
Revere	52,918	98	1,434	6.96	2.39	1.07	3.50	4,854	2,413	1,667	746	10,918	66
Somerville	81,322	128	1,920	11.55	2.92	3.14	5.50	6,016	3,156	1,521	1,635	24,531	68
Stoneham	21,668	63	567	3.61	1.77	0.44	1.40	6,367	3,898	3,122	776	6,984	65
Stoughton	20,231	88	888	3.78	2.04	0.34	1.40	4,257	2,680	2,297	383	3,864	69
Wakefield	26,665	93	888	4.97	3.04	0.42	1.50	5,597	3,896	3,423	473	4,516	56
Walpole	18,341	59	577	2.41	1.03	0.18	1.20	4,177	2,097	1,785	312	3,051	65
Waltham	62,114	138	1,380	9.99	3.58	0.81	5.60	7,239	3,181	2,594	587	5,870	90
Watertown	34,025	75	675	3.92	1.33	0.39	2.20	5,807	2,548	1,970	578	5,200	65
Wellesley	28,485	134	1,340	3.80	1.74	0.36	1.70	2,836	1,567	1,299	269	2,687	60
Westwood	14,255	77	693	2.03	0.94	0.18	0.90	2,929	1,616	1,356	260	2,338	63
Weymouth	54,366	238	2,380	10.23	5.39	1.13	3.70	4,298	2,739	2,265	475	4,748	68
Wilmington	4,834	20	280	1.56	0.65	0.11	0.80	5,571	2,714	2,321	393	5,500	165
Winchester	22,794	83	747	2.69	1.34	0.25	1.10	3,601	2,129	1,794	335	3,012	48
Winthrop	18,190	36	324	2.38	0.98	0.30	1.10	7,346	3,951	3,025	926	8,333	60
Woburn	38,584	141	1,410	6.50	2.21	0.59	3.70	4,610	1,986	1,567	418	4,184	96
Total	2,247,386	5,356	60,249	346.7	124.8	46.2	175.7						
Average	52,265	125	1,401	8.1	2.9	1.1	4.1	5,431	2,915	2,275	640	7,178	73

Table 4 - Estimated Community Wastewater Flow Components for 2018										1-Aug-19		PAGE 1		Annual Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ashland	Average Daily Flow	1.41	1.55	1.74	1.53	1.23	1.03	1.00	1.07	1.11	1.21	1.90	1.50	1.35
	Dry Day Average Daily Flow	1.25	1.48	1.64	1.40	1.21	1.01	0.98	1.04	1.02	1.15	1.65	1.36	1.26
	Estimated Infiltration	0.45	0.68	0.84	0.60	0.41	0.21	0.18	0.24	0.22	0.35	0.85	0.56	0.46
	Estimated Sanitary Flow	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	Estimated Inflow	0.16	0.07	0.10	0.13	0.02	0.02	0.02	0.03	0.09	0.06	0.25	0.14	0.09
Boston (South Only)	Raw Average Daily Flow	26.63	28.62	35.86	31.68	22.55	17.94	16.76	18.42	19.26	21.19	47.52	30.40	26.35
	Raw Dry Day Average Daily Flow	17.50	26.49	32.05	28.13	21.72	17.30	14.97	15.54	15.59	17.54	33.40	26.26	22.16
	Raw Estimated Infiltration	9.20	18.19	23.75	19.83	13.42	9.00	6.67	7.24	7.29	9.24	25.10	17.96	13.86
	MWRA Estimated Infiltration	3.58	7.08	9.24	7.72	5.22	3.50	2.60	2.82	2.84	3.60	9.77	6.99	5.39
	Final Average Daily Flow	23.05	21.54	26.62	23.96	17.33	14.44	14.16	15.60	16.42	17.59	37.75	23.41	20.96
	Final Dry Day Average Daily Flow	13.92	19.41	22.81	20.41	16.50	13.80	12.37	12.72	12.75	13.94	23.63	19.27	16.76
	Final Estimated Infiltration	5.62	11.11	14.51	12.11	8.20	5.50	4.07	4.42	4.45	5.64	15.33	10.97	8.46
	Estimated Sanitary Flow	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30	8.30
	Estimated Inflow	9.13	2.13	3.81	3.55	0.83	0.64	1.79	2.88	3.67	3.65	14.12	4.14	4.20
	Braintree	Raw Average Daily Flow	9.55	10.85	14.46	10.65	8.09	5.51	4.72	4.44	6.26	8.59	16.53	10.76
Raw Dry Day Average Daily Flow	6.61	9.98	13.33	9.79	7.87	5.34	4.68	4.34	5.47	7.60	12.78	9.24	8.07	
Raw Estimated Infiltration	3.41	6.78	10.13	6.59	4.67	2.14	1.48	1.14	2.27	4.40	9.58	6.04	4.87	
MWRA Estimated Infiltration	0.50	1.00	1.49	0.97	0.69	0.32	0.22	0.17	0.33	0.65	1.41	0.89	0.72	
Final Average Daily Flow	9.05	9.85	12.97	9.68	7.40	5.19	4.50	4.27	5.93	7.94	15.12	9.87	8.46	
Final Dry Day Average Daily Flow	6.11	8.98	11.84	8.82	7.18	5.02	4.46	4.17	5.14	6.95	11.37	8.35	7.35	
Final Estimated Infiltration	2.91	5.78	8.64	5.62	3.98	1.82	1.26	0.97	1.94	3.75	8.17	5.15	4.15	
Estimated Sanitary Flow	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	
Estimated Inflow	2.94	0.87	1.13	0.86	0.22	0.17	0.04	0.10	0.79	0.99	3.75	1.52	1.11	
Brookline (South Only)	Raw Average Daily Flow	6.13	6.77	9.59	8.52	5.50	3.61	3.53	3.40	3.91	4.68	12.02	6.88	6.20
	Raw Dry Day Average Daily Flow	3.90	5.97	8.48	7.10	5.40	3.25	3.30	3.02	3.07	3.87	8.36	5.66	5.10
	Raw Estimated Infiltration	1.80	3.87	6.38	5.00	3.30	1.15	1.20	0.92	0.97	1.77	6.26	3.56	3.00
	MWRA Estimated Infiltration	0.01	0.03	0.05	0.04	0.02	0.01	0.01	0.01	0.01	0.01	0.04	0.03	0.02
	Final Average Daily Flow	6.12	6.74	9.54	8.48	5.48	3.60	3.52	3.39	3.90	4.67	11.98	6.85	6.18
	Final Dry Day Average Daily Flow	3.89	5.94	8.43	7.06	5.38	3.24	3.29	3.01	3.06	3.86	8.32	5.63	5.08
	Final Estimated Infiltration	1.79	3.84	6.33	4.96	3.28	1.14	1.19	0.91	0.96	1.76	6.22	3.53	2.98
	Estimated Sanitary Flow	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
	Estimated Inflow	2.23	0.80	1.11	1.42	0.10	0.36	0.23	0.38	0.84	0.81	3.66	1.22	1.09
Canton	Raw Average Daily Flow	4.22	4.40	5.68	4.43	3.42	2.44	2.30	2.42	3.10	3.48	5.67	3.86	3.78
	Raw Dry Day Average Daily Flow	3.25	4.15	4.94	3.99	3.30	2.39	2.26	2.29	2.78	3.20	4.61	3.43	3.38
	Raw Estimated Infiltration	1.85	2.75	3.54	2.59	1.90	0.99	0.86	0.89	1.38	1.80	3.21	2.03	1.98
	MWRA Estimated Infiltration	0.25	0.37	0.47	0.34	0.25	0.13	0.11	0.12	0.18	0.24	0.43	0.27	0.26
	Final Average Daily Flow	3.97	4.03	5.21	4.09	3.17	2.31	2.19	2.30	2.92	3.24	5.24	3.59	3.52
	Final Dry Day Average Daily Flow	3.00	3.78	4.47	3.65	3.05	2.26	2.15	2.17	2.60	2.96	4.18	3.16	3.11
	Final Estimated Infiltration	1.60	2.38	3.07	2.25	1.65	0.86	0.75	0.77	1.20	1.56	2.78	1.76	1.71
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
	Estimated Inflow	0.97	0.25	0.74	0.44	0.12	0.05	0.04	0.13	0.32	0.28	1.06	0.43	0.40
Dedham	Average Daily Flow	4.79	5.27	7.18	5.94	4.14	2.79	2.40	2.48	2.82	3.66	7.14	5.00	4.46
	Dry Day Average Daily Flow	3.42	4.86	6.48	5.14	4.02	2.61	2.30	2.34	2.49	3.31	5.81	4.39	3.92
	Estimated Infiltration	1.62	3.06	4.68	3.34	2.22	0.81	0.50	0.54	0.69	1.51	4.01	2.59	2.12
	Estimated Sanitary Flow	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
	Estimated Inflow	1.37	0.41	0.70	0.80	0.12	0.18	0.10	0.14	0.33	0.35	1.33	0.61	0.54

Table 4 - Estimated Community Wastewater Flow Components for 2018										1-Aug-19				PAGE 2		Annual Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Framingham	Average Daily Flow	7.65	8.83	10.43	9.65	7.91	6.33	6.17	6.63	7.13	7.52	11.18	8.59	8.16		
	Dry Day Average Daily Flow	6.97	8.68	10.01	9.01	7.80	6.16	5.93	6.39	6.72	7.25	9.39	7.83	7.67		
	Estimated Infiltration	2.17	3.88	5.21	4.21	3.00	1.36	1.13	1.59	1.92	2.45	4.59	3.03	2.87		
	Estimated Sanitary Flow	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80		
	Estimated Inflow	0.68	0.15	0.42	0.64	0.11	0.17	0.24	0.24	0.41	0.27	1.79	0.76	0.49		
Hingham	Average Daily Flow	1.67	1.81	2.52	1.66	1.36	0.93	0.80	0.74	0.95	1.44	2.98	1.81	1.55		
	Dry Day Average Daily Flow	1.17	1.65	2.17	1.52	1.36	0.90	0.79	0.71	0.83	1.18	2.29	1.55	1.34		
	Estimated Infiltration	0.67	1.15	1.67	1.02	0.86	0.40	0.29	0.21	0.33	0.68	1.79	1.05	0.84		
	Estimated Sanitary Flow	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		
	Estimated Inflow	0.50	0.16	0.35	0.14	0.00	0.03	0.01	0.03	0.12	0.26	0.69	0.26	0.21		
Holbrook	Average Daily Flow	1.00	1.16	1.47	1.19	0.95	0.76	0.79	0.78	0.74	0.98	1.50	1.13	1.04		
	Dry Day Average Daily Flow	0.81	1.06	1.33	1.09	0.95	0.74	0.77	0.75	0.69	0.89	1.23	0.95	0.94		
	Estimated Infiltration	0.31	0.56	0.83	0.59	0.45	0.24	0.27	0.25	0.19	0.39	0.73	0.45	0.44		
	Estimated Sanitary Flow	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		
	Estimated Inflow	0.19	0.10	0.14	0.10	0.00	0.02	0.02	0.03	0.05	0.09	0.27	0.18	0.10		
Milton (South Only)	Average Daily Flow	3.84	4.22	5.82	4.38	3.03	1.93	1.66	1.80	2.32	3.10	7.04	4.23	3.61		
	Dry Day Average Daily Flow	2.54	3.72	5.05	3.57	2.98	1.82	1.61	1.71	1.95	2.64	5.29	3.49	3.02		
	Estimated Infiltration	1.29	2.47	3.80	2.32	1.73	0.57	0.36	0.46	0.70	1.39	4.04	2.24	1.77		
	Estimated Sanitary Flow	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25		
	Estimated Inflow	1.30	0.50	0.77	0.81	0.05	0.11	0.05	0.09	0.37	0.46	1.75	0.74	0.58		
Natick	Average Daily Flow	2.88	3.38	4.38	3.93	3.02	2.34	2.21	2.42	2.50	2.82	4.81	3.76	3.20		
	Dry Day Average Daily Flow	2.39	3.11	4.17	3.62	2.97	2.27	2.18	2.36	2.26	2.68	4.11	3.42	2.96		
	Estimated Infiltration	0.59	1.31	2.37	1.82	1.17	0.47	0.38	0.56	0.46	0.88	2.31	1.62	1.16		
	Estimated Sanitary Flow	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80		
	Estimated Inflow	0.49	0.27	0.21	0.31	0.05	0.07	0.03	0.06	0.24	0.14	0.70	0.34	0.24		
Needham	Average Daily Flow	3.87	4.54	6.36	5.53	4.20	3.06	2.63	2.81	3.06	3.68	7.27	5.05	4.33		
	Dry Day Average Daily Flow	2.97	4.21	5.82	5.09	4.17	2.91	2.51	2.71	2.78	3.33	6.11	4.38	3.91		
	Estimated Infiltration	1.07	2.31	3.92	3.19	2.27	1.01	0.61	0.81	0.88	1.43	4.21	2.48	2.01		
	Estimated Sanitary Flow	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90		
	Estimated Inflow	0.90	0.33	0.54	0.44	0.03	0.15	0.12	0.10	0.28	0.35	1.16	0.67	0.42		
Newton (South Only)	Raw Average Daily Flow	9.25	10.28	14.62	13.51	9.98	6.08	5.63	5.87	5.57	7.42	18.02	13.66	9.98		
	Raw Dry Day Average Daily Flow	6.78	9.48	13.69	12.06	9.54	5.79	5.48	5.31	4.92	6.54	15.63	11.83	8.91		
	Raw Estimated Infiltration	2.68	5.38	9.59	7.96	5.44	1.69	1.38	1.21	0.82	2.44	11.53	7.73	4.81		
	MWRA Estimated Infiltration	0.01	0.01	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.01	0.03	0.02	0.01		
	Final Average Daily Flow	9.24	10.27	14.59	13.49	9.97	6.08	5.63	5.87	5.57	7.41	17.99	13.64	9.97		
	Final Dry Day Average Daily Flow	6.77	9.47	13.66	12.04	9.53	5.79	5.48	5.31	4.92	6.53	15.60	11.81	8.90		
	Final Estimated Infiltration	2.67	5.37	9.56	7.94	5.43	1.69	1.38	1.21	0.82	2.43	11.50	7.71	4.80		
	Estimated Sanitary Flow	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10		
	Estimated Inflow	2.47	0.80	0.93	1.45	0.44	0.29	0.15	0.56	0.65	0.88	2.39	1.83	1.07		

Table 4 - Estimated Community Wastewater Flow Components for 2018										1-Aug-19		PAGE 3		Annual Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Norwood	Raw Average Daily Flow	7.71	8.49	12.23	9.57	6.61	4.79	4.22	4.37	6.07	7.14	13.01	8.61	7.72
	Raw Dry Day Average Daily Flow	6.48	7.82	11.51	8.65	6.54	4.76	4.15	4.20	5.46	6.57	10.64	7.20	6.99
	Raw Estimated Infiltration	4.08	5.42	9.11	6.25	4.14	2.36	1.75	1.80	3.06	4.17	8.24	4.80	4.59
	MWRA Estimated Infiltration	0.42	0.56	0.94	0.65	0.43	0.24	0.18	0.19	0.32	0.43	0.85	0.50	0.47
	Final Average Daily Flow	7.29	7.93	11.29	8.92	6.18	4.55	4.04	4.18	5.75	6.71	12.16	8.11	7.25
	Final Dry Day Average Daily Flow	6.06	7.26	10.57	8.00	6.11	4.52	3.97	4.01	5.14	6.14	9.79	6.70	6.51
	Final Estimated Infiltration	3.66	4.86	8.17	5.60	3.71	2.12	1.57	1.61	2.74	3.74	7.39	4.30	4.11
	Estimated Sanitary Flow	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
	Estimated Inflow	1.23	0.67	0.72	0.92	0.07	0.03	0.07	0.17	0.61	0.57	2.37	1.41	0.73
Quincy	Average Daily Flow	15.02	15.69	21.77	16.29	13.76	11.55	10.84	10.83	12.38	13.90	22.84	15.87	15.05
	Dry Day Average Daily Flow	11.35	14.89	19.11	15.08	13.74	11.35	10.32	10.24	11.09	12.56	18.17	13.87	13.46
	Estimated Infiltration	3.15	6.69	10.91	6.88	5.54	3.15	2.12	2.04	2.89	4.36	9.97	5.67	5.26
	Estimated Sanitary Flow	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20
	Estimated Inflow	3.67	0.80	2.66	1.21	0.02	0.20	0.52	0.59	1.29	1.34	4.67	2.00	1.58
Randolph	Average Daily Flow	4.46	4.74	7.05	5.09	3.89	2.90	2.49	2.35	2.84	3.75	6.64	4.61	4.23
	Dry Day Average Daily Flow	3.62	4.48	6.11	4.69	3.79	2.87	2.44	2.29	2.60	3.46	5.30	4.11	3.81
	Estimated Infiltration	1.72	2.58	4.21	2.79	1.89	0.97	0.54	0.39	0.70	1.56	3.40	2.21	1.91
	Estimated Sanitary Flow	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
	Estimated Inflow	0.84	0.26	0.94	0.40	0.10	0.03	0.05	0.06	0.24	0.29	1.34	0.50	0.42
Stoughton	Average Daily Flow	3.64	4.24	6.04	5.08	3.71	2.59	2.12	1.99	2.52	3.47	5.78	4.29	3.78
	Dry Day Average Daily Flow	2.80	3.96	5.55	4.75	3.67	2.54	2.09	1.92	2.30	3.21	4.80	3.78	3.44
	Estimated Infiltration	1.40	2.56	4.15	3.35	2.27	1.14	0.69	0.52	0.90	1.81	3.40	2.38	2.04
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
	Estimated Inflow	0.84	0.28	0.49	0.33	0.04	0.05	0.03	0.07	0.22	0.26	0.98	0.51	0.34
Walpole	Average Daily Flow	2.30	2.49	3.32	2.96	2.22	1.59	1.54	1.79	2.02	2.31	3.57	2.89	2.41
	Dry Day Average Daily Flow	1.85	2.37	3.16	2.73	2.19	1.54	1.52	1.64	1.86	2.24	3.07	2.67	2.23
	Estimated Infiltration	0.65	1.17	1.96	1.53	0.99	0.34	0.32	0.44	0.66	1.04	1.87	1.47	1.03
	Estimated Sanitary Flow	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
	Estimated Inflow	0.45	0.12	0.16	0.23	0.03	0.05	0.02	0.15	0.16	0.07	0.50	0.22	0.18
Wellesley	Average Daily Flow	3.41	3.96	5.73	5.23	3.68	2.46	2.15	2.30	2.65	3.12	6.46	4.51	3.80
	Dry Day Average Daily Flow	2.59	3.68	5.40	4.63	3.57	2.37	2.13	2.28	2.40	2.93	5.55	3.81	3.44
	Estimated Infiltration	0.89	1.98	3.70	2.93	1.87	0.67	0.43	0.58	0.70	1.23	3.85	2.11	1.74
	Estimated Sanitary Flow	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
	Estimated Inflow	0.82	0.28	0.33	0.60	0.11	0.09	0.02	0.02	0.25	0.19	0.91	0.70	0.36
Westwood	Average Daily Flow	2.19	2.34	2.85	2.46	1.89	1.38	1.16	1.20	1.41	1.75	3.39	2.34	2.03
	Dry Day Average Daily Flow	1.73	2.17	2.62	2.24	1.83	1.36	1.13	1.17	1.31	1.66	2.76	2.18	1.84
	Estimated Infiltration	0.83	1.27	1.72	1.34	0.93	0.46	0.23	0.27	0.41	0.76	1.86	1.28	0.94
	Estimated Sanitary Flow	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
	Estimated Inflow	0.46	0.17	0.23	0.22	0.06	0.02	0.03	0.03	0.10	0.09	0.63	0.16	0.18

Table 4 - Estimated Community Wastewater Flow Components for 2018										1-Aug-19		PAGE 4		Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Weymouth	Average Daily Flow	10.82	11.45	15.33	12.12	9.13	6.67	6.00	5.64	7.39	9.82	17.03	11.50	10.23
	Dry Day Average Daily Flow	8.23	10.72	13.76	11.11	8.90	6.59	5.69	5.47	6.55	8.85	13.41	10.04	9.09
	Estimated Infiltration	4.53	7.02	10.06	7.41	5.20	2.89	1.99	1.77	2.85	5.15	9.71	6.34	5.39
	Estimated Sanitary Flow	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
	Estimated Inflow	2.59	0.73	1.57	1.01	0.23	0.08	0.31	0.17	0.84	0.97	3.62	1.46	1.13
Subtotal (Southern System)	Raw Average Daily Flow	132.44	145.08	194.43	161.40	120.27	88.68	81.12	83.75	96.01	115.03	222.30	151.25	132.44
	Raw Dry Day Average Daily Flow	98.21	134.93	176.38	145.39	117.52	85.87	77.23	77.72	84.14	102.66	174.36	131.45	116.95
	Raw Estimated Infiltration	44.36	81.08	122.53	91.54	63.67	32.02	23.38	23.87	30.29	48.81	120.51	77.60	63.10
	MWRA Estimated Infiltration	4.77	9.05	12.22	9.74	6.62	4.20	3.12	3.31	3.68	4.94	12.53	8.70	6.88
	Final Average Daily Flow	127.67	136.03	182.21	151.66	113.65	84.48	78.00	80.44	92.33	110.09	209.77	142.55	125.56
	Final Dry Day Average Daily Flow	93.44	125.88	164.16	135.65	110.90	81.67	74.11	74.41	80.46	97.72	161.83	122.75	110.07
	Final Estimated Infiltration	39.59	72.03	110.31	81.80	57.05	27.82	20.26	20.56	26.61	43.87	107.98	68.90	56.22
	Estimated Sanitary Flow	53.85	53.85	53.85	53.85	53.85	53.85	53.85	53.85	53.85	53.85	53.85	53.85	53.85
	Estimated Inflow	34.23	10.15	18.05	16.01	2.75	2.81	3.89	6.03	11.87	12.37	47.94	19.80	15.49
South System Pump Station as Reported by NPDES	Average Daily Flow	131.70	142.50	195.50	159.10	117.70	86.20	79.30	81.00	95.30	116.00	217.10	146.00	130.42

Table 4 - Estimated Community Wastewater Flow Components for 2018										1-Aug-19		PAGE 5		Annual Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Arlington	Raw Average Daily Flow	5.15	6.06	7.88	7.13	5.17	3.63	3.28	3.23	3.49	4.02	9.31	6.57	5.40
	Raw Dry Day Average Daily Flow	3.87	5.65	7.41	6.32	5.05	3.41	3.19	3.11	3.22	3.65	8.01	5.55	4.86
	Raw Estimated Infiltration	1.37	3.15	4.91	3.82	2.55	0.91	0.69	0.61	0.72	1.15	5.51	3.05	2.36
	MWRA Estimated Infiltration	0.06	0.13	0.20	0.16	0.11	0.04	0.03	0.03	0.03	0.05	0.23	0.13	0.10
	Final Average Daily Flow	5.09	5.93	7.68	6.97	5.06	3.59	3.25	3.20	3.46	3.97	9.08	6.44	5.30
	Final Dry Day Average Daily Flow	3.81	5.52	7.21	6.16	4.94	3.37	3.16	3.08	3.19	3.60	7.78	5.42	4.76
	Final Estimated Infiltration	1.31	3.02	4.71	3.66	2.44	0.87	0.66	0.58	0.69	1.10	5.28	2.92	2.26
	Estimated Sanitary Flow	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Bedford	Estimated Inflow	1.28	0.41	0.47	0.81	0.12	0.22	0.09	0.12	0.27	0.37	1.30	1.02	0.54
	Average Daily Flow	2.55	2.93	3.71	3.67	2.81	2.09	1.86	1.89	1.97	1.97	3.86	3.33	2.72
	Dry Day Average Daily Flow	2.30	2.81	3.65	3.43	2.76	2.01	1.83	1.81	1.93	1.88	3.54	2.95	2.57
	Estimated Infiltration	1.00	1.51	2.35	2.13	1.46	0.71	0.53	0.51	0.63	0.58	2.24	1.65	1.27
	Estimated Sanitary Flow	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
Belmont	Estimated Inflow	0.25	0.12	0.06	0.24	0.05	0.08	0.03	0.08	0.04	0.09	0.32	0.38	0.14
	Average Daily Flow	3.20	3.82	5.50	4.66	3.02	2.03	2.00	2.07	2.05	2.75	6.34	3.96	3.44
	Dry Day Average Daily Flow	2.13	3.50	5.12	3.92	2.90	1.89	1.90	1.93	1.85	2.41	4.93	3.25	2.97
	Estimated Infiltration	0.73	2.10	3.72	2.52	1.50	0.49	0.50	0.53	0.45	1.01	3.53	1.85	1.57
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
Boston (North Only)	Estimated Inflow	1.07	0.32	0.38	0.74	0.12	0.14	0.10	0.14	0.20	0.34	1.41	0.71	0.47
	Raw Average Daily Flow	3.55	3.47	4.45	3.68	2.40	2.96	3.03	3.47	4.24	4.10	5.64	3.45	3.70
	Raw Dry Day Average Daily Flow	2.56	3.29	3.00	2.67	2.35	2.77	2.23	2.40	2.29	3.15	3.16	2.86	2.72
	Raw Estimated Infiltration	0.86	1.59	1.30	0.97	0.65	1.07	0.53	0.70	0.59	1.45	1.46	1.16	1.02
	MWRA Estimated Infiltration	0.12	0.21	0.17	0.13	0.09	0.14	0.07	0.09	0.08	0.19	0.20	0.16	0.14
	Final Average Daily Flow	3.43	3.26	4.28	3.55	2.31	2.82	2.96	3.38	4.16	3.91	5.44	3.29	3.56
	Final Dry Day Average Daily Flow	2.44	3.08	2.83	2.54	2.26	2.63	2.16	2.31	2.21	2.96	2.96	2.70	2.59
	Final Estimated Infiltration	0.74	1.38	1.13	0.84	0.56	0.93	0.46	0.61	0.51	1.26	1.26	1.00	0.89
Boston Charlestown	Estimated Sanitary Flow	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
	Estimated Inflow	0.99	0.18	1.45	1.01	0.05	0.19	0.80	1.07	1.95	0.95	2.48	0.59	0.98
	Raw Average Daily Flow	36.05	34.16	42.09	36.85	30.26	27.78	29.09	31.45	33.71	32.68	51.40	34.93	35.02
	Raw Dry Day Average Daily Flow	28.08	31.54	34.00	29.39	28.86	25.50	25.56	26.49	26.51	26.31	32.52	30.70	28.77
	Raw Estimated Infiltration	7.58	11.04	13.50	8.89	8.36	5.00	5.06	5.99	6.01	5.81	12.02	10.20	8.27
	MWRA Estimated Infiltration	0.21	0.31	0.38	0.25	0.23	0.14	0.14	0.17	0.17	0.16	0.34	0.28	0.23
	Final Average Daily Flow	35.84	33.85	41.71	36.60	30.03	27.64	28.95	31.28	33.54	32.52	51.06	34.65	34.79
	Final Dry Day Average Daily Flow	27.87	31.23	33.62	29.14	28.63	25.36	25.42	26.32	26.34	26.15	32.18	30.42	28.54
Boston Columbus Park	Final Estimated Infiltration	7.37	10.73	13.12	8.64	8.13	4.86	4.92	5.82	5.84	5.65	11.68	9.92	8.04
	Estimated Sanitary Flow	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50	20.50
	Estimated Inflow	7.97	2.62	8.09	7.46	1.40	2.28	3.53	4.96	7.20	6.37	18.88	4.23	6.25
	Raw Average Daily Flow	6.80	6.56	7.31	6.57	6.14	6.46	6.38	6.44	6.05	5.54	11.20	5.97	6.78
	Raw Dry Day Average Daily Flow	5.40	6.14	6.21	5.69	6.11	6.00	5.78	4.80	4.71	4.57	5.95	4.94	5.52
	Raw Estimated Infiltration	1.90	2.64	2.71	2.19	2.61	2.50	2.28	1.30	1.21	1.07	2.45	1.44	2.02
	MWRA Estimated Infiltration	0.29	0.40	0.41	0.33	0.39	0.38	0.35	0.20	0.18	0.16	0.37	0.22	0.31
	Final Average Daily Flow	6.51	6.16	6.90	6.24	5.75	6.08	6.03	6.24	5.87	5.38	10.83	5.75	6.47
Boston East Boston	Final Dry Day Average Daily Flow	5.11	5.74	5.80	5.36	5.72	5.62	5.43	4.60	4.53	4.41	5.58	4.72	5.21
	Final Estimated Infiltration	1.61	2.24	2.30	1.86	2.22	2.12	1.93	1.10	1.03	0.91	2.08	1.22	1.71
	Estimated Sanitary Flow	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	Estimated Inflow	1.40	0.42	1.10	0.88	0.03	0.46	0.60	1.64	1.34	0.97	5.25	1.03	1.26

Table 4 - Estimated Community Wastewater Flow Components for 2018										1-Aug-19		PAGE 6		Annual Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Boston Ward Street	Raw Average Daily Flow	32.13	29.51	39.16	38.11	31.26	29.74	31.01	31.68	33.83	33.16	44.51	31.11	33.77
	Raw Dry Day Average Daily Flow	30.38	27.70	36.35	32.78	30.15	26.79	27.40	28.08	28.37	30.67	32.32	26.82	29.83
	Raw Estimated Infiltration	5.88	3.20	11.85	8.28	5.65	2.29	2.90	3.58	3.87	6.17	7.82	2.32	5.33
	MWRA Estimated Infiltration	1.01	0.55	2.03	1.42	0.97	0.39	0.50	0.61	0.66	1.05	1.34	0.40	0.91
	Final Average Daily Flow	31.12	28.96	37.13	36.69	30.29	29.35	30.51	31.07	33.17	32.11	43.17	30.71	32.86
	Final Dry Day Average Daily Flow	29.37	27.15	34.32	31.36	29.18	26.40	26.90	27.47	27.71	29.62	30.98	26.42	28.92
	Final Estimated Infiltration	4.87	2.65	9.82	6.86	4.68	1.90	2.40	2.97	3.21	5.12	6.48	1.92	4.42
	Estimated Sanitary Flow	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50	24.50
Boston (North Total)	Estimated Inflow	1.75	1.81	2.81	5.33	1.11	2.95	3.61	3.60	5.46	2.49	12.19	4.29	3.94
	Raw Average Daily Flow	78.53	73.70	93.01	85.21	70.06	66.94	69.51	73.04	77.83	75.48	112.75	75.46	79.27
	Raw Dry Day Average Daily Flow	66.42	68.67	79.56	70.53	67.47	61.06	60.97	61.77	61.88	64.70	73.95	65.32	66.84
	Raw Estimated Infiltration	16.22	18.47	29.36	20.33	17.27	10.86	10.77	11.57	11.68	14.50	23.75	15.12	16.64
	MWRA Estimated Infiltration	1.63	1.47	2.99	2.13	1.68	1.05	1.06	1.07	1.09	1.56	2.25	1.06	1.59
	Final Average Daily Flow	76.90	72.23	90.02	83.08	68.38	65.89	68.45	71.97	76.74	73.92	110.50	74.40	77.68
	Final Dry Day Average Daily Flow	64.79	67.20	76.57	68.40	65.79	60.01	59.91	60.70	60.79	63.14	71.70	64.26	65.26
	Final Estimated Infiltration	14.59	17.00	26.37	18.20	15.59	9.81	9.71	10.50	10.59	12.94	21.50	14.06	15.06
Brookline (North Only)	Estimated Sanitary Flow	50.20	50.20	50.20	50.20	50.20	50.20	50.20	50.20	50.20	50.20	50.20	50.20	50.20
	Estimated Inflow	12.11	5.03	13.45	14.68	2.59	5.88	8.54	11.27	15.95	10.78	38.80	10.14	12.43
	Average Daily Flow	3.04	2.99	3.53	3.67	3.25	2.79	3.06	3.03	3.39	3.17	4.59	3.59	3.34
	Dry Day Average Daily Flow	2.65	2.84	3.38	3.30	2.96	2.55	2.79	2.62	3.02	2.89	3.64	3.29	2.99
	Estimated Infiltration	0.55	0.74	1.28	1.20	0.86	0.45	0.69	0.52	0.92	0.79	1.54	1.19	0.89
Burlington	Estimated Sanitary Flow	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
	Estimated Inflow	0.39	0.15	0.15	0.37	0.29	0.24	0.27	0.41	0.37	0.28	0.95	0.30	0.35
	Average Daily Flow	3.86	4.50	5.40	5.33	4.05	3.07	2.69	2.71	2.93	3.20	5.59	4.55	3.98
	Dry Day Average Daily Flow	3.32	4.35	5.25	4.94	3.91	3.02	2.60	2.70	2.76	3.04	5.10	4.08	3.75
	Estimated Infiltration	1.32	2.35	3.25	2.94	1.91	1.02	0.60	0.70	0.76	1.04	3.10	2.08	1.75
Cambridge	Estimated Sanitary Flow	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	Estimated Inflow	0.54	0.15	0.15	0.39	0.14	0.05	0.09	0.01	0.17	0.16	0.49	0.47	0.23
	Raw Average Daily Flow	18.02	19.00	22.60	21.33	19.14	17.38	18.92	20.71	20.15	18.71	27.19	17.89	20.08
	Raw Dry Day Average Daily Flow	14.12	16.03	19.41	17.20	18.37	14.92	18.30	17.87	16.37	15.78	18.23	14.16	16.74
	Raw Estimated Infiltration	2.62	4.53	7.91	5.70	6.87	3.42	6.80	6.37	4.87	4.28	6.73	2.66	5.24
	MWRA Estimated Infiltration	0.37	0.64	1.11	0.80	0.97	0.48	0.96	0.89	0.68	0.60	0.95	0.37	0.74
	Final Average Daily Flow	17.65	18.36	21.49	20.53	18.17	16.90	17.96	19.82	19.47	18.11	26.24	17.52	19.34
	Final Dry Day Average Daily Flow	13.75	15.39	18.30	16.40	17.40	14.44	17.34	16.98	15.69	15.18	17.28	13.79	16.00
Chelsea	Final Estimated Infiltration	2.25	3.89	6.80	4.90	5.90	2.94	5.84	5.48	4.19	3.68	5.78	2.29	4.50
	Estimated Sanitary Flow	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50	11.50
	Estimated Inflow	3.90	2.97	3.19	4.13	0.77	2.46	0.62	2.84	3.78	2.93	8.96	3.73	3.34
	Raw Average Daily Flow	6.06	6.44	8.94	6.95	5.12	5.06	5.00	5.47	5.74	5.46	8.81	5.82	6.23
	Raw Dry Day Average Daily Flow	4.50	5.82	7.76	5.53	4.60	4.20	4.21	4.37	4.38	4.19	5.35	4.82	4.97
	Raw Estimated Infiltration	1.50	2.82	4.76	2.53	1.60	1.20	1.21	1.37	1.38	1.19	2.35	1.82	1.97
	MWRA Estimated Infiltration	0.18	0.34	0.58	0.31	0.20	0.15	0.15	0.17	0.17	0.15	0.29	0.22	0.24
	Final Average Daily Flow	5.88	6.10	8.36	6.64	4.92	4.91	4.85	5.30	5.57	5.31	8.52	5.60	5.99
	Final Dry Day Average Daily Flow	4.32	5.48	7.18	5.22	4.40	4.05	4.06	4.20	4.21	4.04	5.06	4.60	4.73
	Final Estimated Infiltration	1.32	2.48	4.18	2.22	1.40	1.05	1.06	1.20	1.21	1.04	2.06	1.60	1.73
	Estimated Sanitary Flow	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	Estimated Inflow	1.56	0.62	1.18	1.42	0.52	0.86	0.79	1.10	1.36	1.27	3.46	1.00	1.26

Table 4 - Estimated Community Wastewater Flow Components for 2018										1-Aug-19				PAGE 7		Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Everett	Raw Average Daily Flow	6.21	6.10	7.64	6.41	5.39	5.01	5.22	5.46	5.66	5.85	9.52	6.66	6.26		
	Raw Dry Day Average Daily Flow	5.00	5.61	7.03	5.69	5.32	4.58	4.79	5.00	4.84	5.38	7.68	5.93	5.57		
	Raw Estimated Infiltration	1.80	2.41	3.83	2.49	2.12	1.38	1.59	1.80	1.64	2.18	4.48	2.73	2.37		
	MWRA Estimated Infiltration	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01		
	Final Average Daily Flow	6.20	6.09	7.62	6.40	5.38	5.00	5.21	5.45	5.65	5.84	9.50	6.65	6.25		
	Final Dry Day Average Daily Flow	4.99	5.60	7.01	5.68	5.31	4.57	4.78	4.99	4.83	5.37	7.66	5.92	5.56		
	Final Estimated Infiltration	1.79	2.40	3.81	2.48	2.11	1.37	1.58	1.79	1.63	2.17	4.46	2.72	2.36		
	Estimated Sanitary Flow	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20		
Estimated Inflow	1.21	0.49	0.61	0.72	0.07	0.43	0.43	0.46	0.82	0.47	1.84	0.73	0.69			
Lexington	Raw Average Daily Flow	5.25	6.66	9.11	8.89	6.59	3.43	3.77	3.50	3.84	4.94	10.33	7.75	6.16		
	Raw Dry Day Average Daily Flow	4.43	6.32	8.93	8.40	6.41	3.26	3.46	3.41	3.58	4.55	9.43	6.53	5.72		
	Raw Estimated Infiltration	2.23	4.12	6.73	6.20	4.21	1.06	1.26	1.21	1.38	2.35	7.23	4.33	3.52		
	MWRA Estimated Infiltration	0.21	0.39	0.64	0.59	0.40	0.10	0.12	0.11	0.13	0.22	0.68	0.41	0.33		
	Final Average Daily Flow	5.04	6.27	8.47	8.30	6.19	3.33	3.65	3.39	3.71	4.72	9.65	7.34	5.83		
	Final Dry Day Average Daily Flow	4.22	5.93	8.29	7.81	6.01	3.16	3.34	3.30	3.45	4.33	8.75	6.12	5.38		
	Final Estimated Infiltration	2.02	3.73	6.09	5.61	3.81	0.96	1.14	1.10	1.25	2.13	6.55	3.92	3.18		
	Estimated Sanitary Flow	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20		
Estimated Inflow	0.82	0.34	0.18	0.49	0.18	0.17	0.31	0.09	0.26	0.39	0.90	1.22	0.45			
Malden	Raw Average Daily Flow	9.86	10.96	13.86	11.21	9.00	7.78	7.56	8.18	7.35	8.12	15.74	10.86	10.03		
	Raw Dry Day Average Daily Flow	7.53	10.09	13.43	10.33	8.90	7.47	7.34	7.52	6.93	7.50	13.05	9.47	9.12		
	Raw Estimated Infiltration	2.63	5.19	8.53	5.43	4.00	2.57	2.44	2.62	2.03	2.60	8.15	4.57	4.22		
	MWRA Estimated Infiltration	0.25	0.49	0.80	0.51	0.38	0.24	0.23	0.25	0.19	0.24	0.77	0.43	0.40		
	Final Average Daily Flow	9.61	10.47	13.06	10.70	8.62	7.54	7.33	7.93	7.16	7.88	14.97	10.43	9.63		
	Final Dry Day Average Daily Flow	7.28	9.60	12.63	9.82	8.52	7.23	7.11	7.27	6.74	7.26	12.28	9.04	8.72		
	Final Estimated Infiltration	2.38	4.70	7.73	4.92	3.62	2.33	2.21	2.37	1.84	2.36	7.38	4.14	3.82		
	Estimated Sanitary Flow	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90	4.90		
Estimated Inflow	2.33	0.87	0.43	0.88	0.10	0.31	0.22	0.66	0.42	0.62	2.69	1.39	0.91			
Medford	Raw Average Daily Flow	8.13	9.47	13.15	11.23	8.14	6.04	5.43	6.33	6.89	7.24	14.85	9.05	8.81		
	Raw Dry Day Average Daily Flow	6.76	8.78	12.49	9.94	7.93	5.61	5.29	5.62	6.07	6.27	11.64	7.52	7.81		
	Raw Estimated Infiltration	2.56	4.58	8.29	5.74	3.73	1.41	1.09	1.42	1.87	2.07	7.44	3.32	3.61		
	MWRA Estimated Infiltration	0.30	0.53	0.96	0.66	0.43	0.16	0.13	0.16	0.22	0.24	0.86	0.38	0.42		
	Final Average Daily Flow	7.83	8.94	12.19	10.57	7.71	5.88	5.30	6.17	6.67	7.00	13.99	8.67	8.40		
	Final Dry Day Average Daily Flow	6.46	8.25	11.53	9.28	7.50	5.45	5.16	5.46	5.85	6.03	10.78	7.14	7.40		
	Final Estimated Infiltration	2.26	4.05	7.33	5.08	3.30	1.25	0.96	1.26	1.65	1.83	6.58	2.94	3.20		
	Estimated Sanitary Flow	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20		
Estimated Inflow	1.37	0.69	0.66	1.29	0.21	0.43	0.14	0.71	0.82	0.97	3.21	1.53	1.00			
Melrose	Raw Average Daily Flow	4.99	5.77	8.00	6.94	4.79	3.25	2.92	3.27	3.54	4.24	10.64	6.65	5.41		
	Raw Dry Day Average Daily Flow	3.37	5.24	7.54	6.34	4.62	3.11	2.83	3.03	3.19	3.82	8.92	5.67	4.80		
	Raw Estimated Infiltration	1.57	3.44	5.74	4.54	2.82	1.31	1.03	1.23	1.39	2.02	7.12	3.87	3.00		
	MWRA Estimated Infiltration	0.30	0.67	1.11	0.88	0.55	0.25	0.20	0.24	0.27	0.39	1.38	0.75	0.58		
	Final Average Daily Flow	4.69	5.10	6.89	6.06	4.24	3.00	2.72	3.03	3.27	3.85	9.26	5.90	4.83		
	Final Dry Day Average Daily Flow	3.07	4.57	6.43	5.46	4.07	2.86	2.63	2.79	2.92	3.43	7.54	4.92	4.22		
	Final Estimated Infiltration	1.27	2.77	4.63	3.66	2.27	1.06	0.83	0.99	1.12	1.63	5.74	3.12	2.42		
	Estimated Sanitary Flow	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80		
Estimated Inflow	1.62	0.53	0.46	0.60	0.17	0.14	0.09	0.24	0.35	0.42	1.72	0.98	0.61			



Table 4 - Estimated Community Wastewater Flow Components for 2018										1-Aug-19		PAGE 8		Annual Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Milton (North Only)	Average Daily Flow	0.38	0.41	0.58	0.46	0.36	0.23	0.22	0.20	0.22	0.25	0.65	0.44	0.37
	Dry Day Average Daily Flow	0.30	0.38	0.52	0.41	0.35	0.22	0.20	0.19	0.20	0.23	0.54	0.35	0.32
	Estimated Infiltration	0.15	0.23	0.37	0.26	0.20	0.07	0.05	0.04	0.05	0.08	0.39	0.20	0.17
	Estimated Sanitary Flow	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
	Estimated Inflow	0.08	0.03	0.06	0.05	0.01	0.01	0.02	0.01	0.02	0.02	0.11	0.09	0.04
Newton (North Only)	Average Daily Flow	5.57	6.63	9.18	8.08	6.18	5.03	4.00	3.95	4.27	4.76	10.09	7.60	6.27
	Dry Day Average Daily Flow	4.59	6.18	8.94	7.52	5.97	4.83	3.95	3.87	3.96	4.44	8.88	6.62	5.80
	Estimated Infiltration	0.89	2.48	5.24	3.82	2.27	1.13	0.25	0.17	0.26	0.74	5.18	2.92	2.10
	Estimated Sanitary Flow	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
	Estimated Inflow	0.98	0.45	0.24	0.56	0.21	0.20	0.05	0.08	0.31	0.32	1.21	0.98	0.46
Reading	Raw Average Daily Flow	3.14	3.69	5.31	5.07	3.75	2.37	2.06	2.28	2.60	3.04	5.93	4.57	3.65
	Raw Dry Day Average Daily Flow	2.60	3.52	5.08	4.84	3.63	2.25	1.99	2.05	2.32	2.84	5.51	4.04	3.38
	Raw Estimated Infiltration	1.30	2.22	3.78	3.54	2.33	0.95	0.69	0.75	1.02	1.54	4.21	2.74	2.08
	MWRA Estimated Infiltration	0.01	0.02	0.04	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.04	0.03	0.02
	Final Average Daily Flow	3.13	3.67	5.27	5.04	3.73	2.36	2.05	2.27	2.59	3.03	5.89	4.54	3.63
	Final Dry Day Average Daily Flow	2.59	3.50	5.04	4.81	3.61	2.24	1.98	2.04	2.31	2.83	5.47	4.01	3.36
	Final Estimated Infiltration	1.29	2.20	3.74	3.51	2.31	0.94	0.68	0.74	1.01	1.53	4.17	2.71	2.06
	Estimated Sanitary Flow	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
	Estimated Inflow	0.54	0.17	0.23	0.23	0.12	0.12	0.07	0.23	0.28	0.20	0.42	0.53	0.26
Revere	Raw Average Daily Flow	6.89	7.18	9.00	7.11	6.05	4.86	5.06	6.40	6.46	6.88	10.90	6.98	6.98
	Raw Dry Day Average Daily Flow	5.28	6.65	7.77	5.91	6.03	4.20	4.42	5.43	5.31	5.99	8.10	5.86	5.91
	Raw Estimated Infiltration	1.78	3.15	4.27	2.41	2.53	0.70	0.92	1.93	1.81	2.49	4.60	2.36	2.41
	MWRA Estimated Infiltration	0.01	0.02	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.04	0.02	0.02
	Final Average Daily Flow	6.88	7.16	8.97	7.09	6.03	4.85	5.05	6.39	6.45	6.86	10.86	6.96	6.96
	Final Dry Day Average Daily Flow	5.27	6.63	7.74	5.89	6.01	4.19	4.41	5.42	5.30	5.97	8.06	5.84	5.89
	Final Estimated Infiltration	1.77	3.13	4.24	2.39	2.51	0.69	0.91	1.92	1.80	2.47	4.56	2.34	2.39
	Estimated Sanitary Flow	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	Estimated Inflow	1.61	0.53	1.23	1.20	0.02	0.66	0.64	0.97	1.15	0.89	2.80	1.12	1.07
Somerville	Raw Average Daily Flow	11.19	12.46	16.43	14.24	9.55	8.70	9.28	10.80	10.22	11.22	15.99	9.54	11.62
	Raw Dry Day Average Daily Flow	7.44	10.54	12.00	10.01	8.63	6.62	6.75	7.63	7.21	8.98	8.92	7.26	8.49
	Raw Estimated Infiltration	1.94	5.04	6.50	4.51	3.13	1.12	1.25	2.13	1.71	3.48	3.42	1.76	2.99
	MWRA Estimated Infiltration	0.04	0.12	0.15	0.10	0.07	0.03	0.03	0.05	0.04	0.08	0.08	0.04	0.07
	Final Average Daily Flow	11.15	12.34	16.28	14.14	9.48	8.67	9.25	10.75	10.18	11.14	15.91	9.50	11.55
	Final Dry Day Average Daily Flow	7.40	10.42	11.85	9.91	8.56	6.59	6.72	7.58	7.17	8.90	8.84	7.22	8.42
	Final Estimated Infiltration	1.90	4.92	6.35	4.41	3.06	1.09	1.22	2.08	1.67	3.40	3.34	1.72	2.92
	Estimated Sanitary Flow	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	Estimated Inflow	3.75	1.92	4.43	4.23	0.92	2.08	2.53	3.17	3.01	2.24	7.07	2.28	3.14
Stoneham	Raw Average Daily Flow	3.20	3.91	5.62	5.18	3.62	2.50	2.23	2.73	2.92	2.99	7.61	5.03	3.96
	Raw Dry Day Average Daily Flow	2.57	3.27	5.56	4.97	3.04	2.31	2.10	2.42	2.55	2.75	6.25	4.47	3.52
	Raw Estimated Infiltration	1.17	1.87	4.16	3.57	1.64	0.91	0.70	1.02	1.15	1.35	4.85	3.07	2.12
	MWRA Estimated Infiltration	0.19	0.31	0.69	0.59	0.27	0.15	0.12	0.17	0.19	0.22	0.80	0.51	0.35
	Final Average Daily Flow	3.01	3.60	4.93	4.59	3.35	2.35	2.11	2.56	2.73	2.77	6.81	4.52	3.61
	Final Dry Day Average Daily Flow	2.38	2.96	4.87	4.38	2.77	2.16	1.98	2.25	2.36	2.53	5.45	3.96	3.17
	Final Estimated Infiltration	0.98	1.56	3.47	2.98	1.37	0.76	0.58	0.85	0.96	1.13	4.05	2.56	1.77
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
	Estimated Inflow	0.63	0.64	0.06	0.21	0.58	0.19	0.13	0.31	0.37	0.24	1.36	0.56	0.44

Table 4 - Estimated Community Wastewater Flow Components for 2018										1-Aug-19				PAGE 9		Annual Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Wakefield	Raw Average Daily Flow	4.24	5.30	7.28	6.78	4.81	3.19	2.84	3.22	3.41	3.88	8.57	6.33	4.98		
	Raw Dry Day Average Daily Flow	3.19	4.89	7.10	6.31	4.66	3.06	2.78	3.02	3.08	3.52	7.77	5.38	4.56		
	Raw Estimated Infiltration	1.69	3.39	5.60	4.81	3.16	1.56	1.28	1.52	1.58	2.02	6.27	3.88	3.06		
	MWRA Estimated Infiltration	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.02	0.01		
	Final Average Daily Flow	4.23	5.29	7.26	6.76	4.80	3.18	2.83	3.21	3.40	3.87	8.54	6.31	4.97		
	Final Dry Day Average Daily Flow	3.18	4.88	7.08	6.29	4.65	3.05	2.77	3.01	3.07	3.51	7.74	5.36	4.54		
	Final Estimated Infiltration	1.68	3.38	5.58	4.79	3.15	1.55	1.27	1.51	1.57	2.01	6.24	3.86	3.04		
	Estimated Sanitary Flow	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50		
Estimated Inflow	1.05	0.41	0.18	0.47	0.15	0.13	0.06	0.20	0.33	0.36	0.80	0.95	0.42			
Waltham	Raw Average Daily Flow	9.44	10.67	13.95	12.56	10.03	7.75	7.48	7.36	8.13	8.75	14.49	11.40	10.16		
	Raw Dry Day Average Daily Flow	7.56	10.11	13.44	11.51	9.61	7.20	7.21	7.18	7.18	8.20	13.20	9.89	9.35		
	Raw Estimated Infiltration	1.96	4.51	7.84	5.91	4.01	1.60	1.61	1.58	1.58	2.60	7.60	4.29	3.75		
	MWRA Estimated Infiltration	0.09	0.20	0.35	0.27	0.18	0.07	0.07	0.07	0.07	0.12	0.34	0.19	0.17		
	Final Average Daily Flow	9.35	10.47	13.60	12.29	9.85	7.68	7.41	7.29	8.06	8.63	14.15	11.21	9.99		
	Final Dry Day Average Daily Flow	7.47	9.91	13.09	11.24	9.43	7.13	7.14	7.11	7.11	8.08	12.86	9.70	9.18		
	Final Estimated Infiltration	1.87	4.31	7.49	5.64	3.83	1.53	1.54	1.51	1.51	2.48	7.26	4.10	3.58		
	Estimated Sanitary Flow	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60		
Estimated Inflow	1.88	0.56	0.51	1.05	0.42	0.55	0.27	0.18	0.95	0.55	1.29	1.51	0.81			
Watertown	Average Daily Flow	3.81	4.32	5.60	4.89	3.61	2.75	2.60	2.63	2.89	3.20	6.41	4.45	3.92		
	Dry Day Average Daily Flow	3.03	3.98	5.42	4.32	3.48	2.58	2.52	2.52	2.56	2.90	5.24	3.88	3.53		
	Estimated Infiltration	0.83	1.78	3.22	2.12	1.28	0.38	0.32	0.32	0.36	0.70	3.04	1.68	1.33		
	Estimated Sanitary Flow	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20		
	Estimated Inflow	0.78	0.34	0.18	0.57	0.13	0.17	0.08	0.11	0.33	0.30	1.17	0.57	0.39		
Wilmington	Raw Average Daily Flow	1.47	1.59	1.89	2.01	1.45	1.30	1.24	1.39	1.40	1.48	1.96	1.59	1.56		
	Raw Dry Day Average Daily Flow	1.45	1.49	1.85	1.80	1.41	1.23	1.18	1.32	1.22	1.40	1.77	1.36	1.46		
	Raw Estimated Infiltration	0.65	0.69	1.05	1.00	0.61	0.43	0.38	0.52	0.42	0.60	0.97	0.56	0.66		
	MWRA Estimated Infiltration	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.01		
	Final Average Daily Flow	1.46	1.58	1.88	2.00	1.44	1.30	1.24	1.38	1.40	1.47	1.95	1.58	1.56		
	Final Dry Day Average Daily Flow	1.44	1.48	1.84	1.79	1.40	1.23	1.18	1.31	1.22	1.39	1.76	1.35	1.45		
	Final Estimated Infiltration	0.64	0.68	1.04	0.99	0.60	0.43	0.38	0.51	0.42	0.59	0.96	0.55	0.65		
	Estimated Sanitary Flow	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80		
Estimated Inflow	0.02	0.10	0.04	0.21	0.04	0.07	0.06	0.07	0.18	0.08	0.19	0.23	0.11			
Winchester	Average Daily Flow	2.40	3.04	3.94	3.72	2.65	1.77	1.54	1.54	1.74	1.97	4.70	3.40	2.69		
	Dry Day Average Daily Flow	1.82	2.81	3.70	3.45	2.55	1.67	1.52	1.51	1.53	1.83	3.99	3.02	2.44		
	Estimated Infiltration	0.72	1.71	2.60	2.35	1.45	0.57	0.42	0.41	0.43	0.73	2.89	1.92	1.34		
	Estimated Sanitary Flow	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10		
	Estimated Inflow	0.58	0.23	0.24	0.27	0.10	0.10	0.02	0.03	0.21	0.14	0.71	0.38	0.25		
Winthrop	Average Daily Flow	2.30	2.32	3.01	2.39	2.08	1.97	1.93	1.91	2.10	2.50	3.63	2.49	2.38		
	Dry Day Average Daily Flow	1.84	2.22	2.57	2.10	2.02	1.97	1.76	1.70	1.79	2.18	2.68	2.16	2.08		
	Estimated Infiltration	0.74	1.12	1.47	1.00	0.92	0.87	0.66	0.60	0.69	1.08	1.58	1.06	0.98		
	Estimated Sanitary Flow	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10		
	Estimated Inflow	0.46	0.10	0.44	0.29	0.06	0.00	0.17	0.21	0.31	0.32	0.95	0.33	0.30		

Table 4 - Estimated Community Wastewater Flow Components for 2018										1-Aug-19		PAGE 10		Annual Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Woburn	Raw Average Daily Flow	7.12	8.29	9.48	8.47	6.87	5.43	5.07	4.93	5.01	5.71	8.76	7.36	6.86
	Raw Dry Day Average Daily Flow	5.82	7.54	8.95	7.73	6.48	5.28	4.91	4.69	4.54	5.47	7.76	6.27	6.28
	Raw Estimated Infiltration	2.12	3.84	5.25	4.03	2.78	1.58	1.21	0.99	0.84	1.77	4.06	2.57	2.58
	MWRA Estimated Infiltration	0.30	0.54	0.74	0.57	0.39	0.22	0.17	0.14	0.12	0.25	0.57	0.36	0.36
	Final Average Daily Flow	6.82	7.75	8.74	7.90	6.48	5.21	4.90	4.79	4.89	5.46	8.19	7.00	6.50
	Final Dry Day Average Daily Flow	5.52	7.00	8.21	7.16	6.09	5.06	4.74	4.55	4.42	5.22	7.19	5.91	5.91
	Final Estimated Infiltration	1.82	3.30	4.51	3.46	2.39	1.36	1.04	0.85	0.72	1.52	3.49	2.21	2.21
	Estimated Sanitary Flow	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
	Estimated Inflow	1.30	0.75	0.53	0.74	0.39	0.15	0.16	0.24	0.47	0.24	1.00	1.09	0.59
Subtotal (Northern System)	Raw Average Daily Flow	216.00	228.21	293.60	263.59	207.54	176.35	176.77	188.23	196.20	201.78	339.21	233.32	226.53
	Raw Dry Day Average Daily Flow	173.89	209.29	263.86	226.75	199.06	160.51	160.79	164.29	163.47	176.79	254.08	199.10	195.82
	Raw Estimated Infiltration	52.04	87.44	142.01	104.90	77.21	38.66	38.94	42.44	41.62	54.94	132.23	77.25	73.97
	MWRA Estimated Infiltration	3.97	5.90	10.44	7.66	5.70	2.98	3.31	3.40	3.24	4.18	9.34	4.94	5.41
	Final Average Daily Flow	212.03	222.31	283.16	255.93	201.84	173.37	173.46	184.83	192.96	197.60	329.87	228.38	221.12
	Final Dry Day Average Daily Flow	169.92	203.39	253.42	219.09	193.36	157.53	157.48	160.89	160.23	172.61	244.74	194.16	190.41
	Final Estimated Infiltration	48.07	81.54	131.57	97.24	71.51	35.68	35.63	39.04	38.38	50.76	122.89	72.31	68.56
	Estimated Sanitary Flow	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85
	Estimated Inflow	42.11	18.92	29.74	36.84	8.48	15.84	15.98	23.94	32.73	24.99	85.13	34.22	30.71
Total (North and South)	Raw Average Daily Flow	348.44	373.29	488.03	424.99	327.81	265.03	257.89	271.98	292.21	316.81	561.51	384.57	358.97
	Raw Dry Day Average Daily Flow	272.10	344.22	440.24	372.14	316.58	246.38	238.02	242.01	247.61	279.45	428.44	330.55	312.77
	Raw Estimated Infiltration	96.40	168.52	264.54	196.44	140.88	70.68	62.32	66.31	71.91	103.75	252.74	154.85	137.07
	MWRA Estimated Infiltration	8.74	14.95	22.66	17.40	12.32	7.18	6.43	6.71	6.92	9.12	21.87	13.64	12.30
	Final Average Daily Flow	339.70	358.34	465.37	407.59	315.49	257.85	251.46	265.27	285.29	307.69	539.64	370.93	346.68
	Final Dry Day Average Daily Flow	263.36	329.27	417.58	354.74	304.26	239.20	231.59	235.30	240.69	270.33	406.57	316.91	300.48
	Final Estimated Infiltration	87.66	153.57	241.88	179.04	128.56	63.50	55.89	59.60	64.99	94.63	230.87	141.21	124.78
	Estimated Sanitary Flow	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70
	Estimated Inflow	76.34	29.07	47.79	52.85	11.23	18.65	19.87	29.97	44.60	37.36	133.07	54.02	46.20
North System as Reported by NPDES	Average Daily Flow	224.90	235.00	303.50	271.80	213.50	187.60	185.30	199.20	208.40	210.00	357.90	246.40	236.76
Total System as Reported by NPDES	Average Daily Flow	356.60	377.50	499.00	430.90	331.20	273.80	264.60	280.20	303.70	326.00	575.00	392.40	367.18

Table 4 - Estimated Community Wastewater Flow Components for 2018										1-Aug-19		PAGE 11		Annual Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Chelsea Creek	Average Daily Flow	106.36	118.68	156.87	140.80	106.94	83.96	79.87	86.17	89.64	92.86	177.05	121.24	113.22
	Dry Day Average Daily Flow	82.06	110.57	142.79	124.28	106.33	73.98	72.66	74.33	75.52	80.24	138.97	102.39	98.53
	Estimated Infiltration	35.16	63.67	95.89	77.38	59.43	27.08	25.76	27.43	28.62	33.34	92.07	55.49	51.63
	Estimated Sanitary Flow	46.90	46.90	46.90	46.90	46.90	46.90	46.90	46.90	46.90	46.90	46.90	46.90	46.90
	Estimated Inflow	24.30	8.11	14.08	16.52	0.61	9.98	7.21	11.84	14.12	12.62	38.08	18.85	14.69
Columbus Park	Average Daily Flow	37.22	35.30	43.63	38.12	31.00	31.11	29.93	32.23	34.63	33.42	53.41	35.82	36.29
	Dry Day Average Daily Flow	28.67	32.47	35.13	30.22	29.48	30.58	25.93	27.00	26.93	26.69	33.39	31.27	29.79
	Estimated Infiltration	8.02	11.82	14.48	9.57	8.83	9.93	5.28	6.35	6.28	6.04	12.74	10.62	9.14
	Estimated Sanitary Flow	20.65	20.65	20.65	20.65	20.65	20.65	20.65	20.65	20.65	20.65	20.65	20.65	20.65
	Estimated Inflow	8.55	2.83	8.50	7.90	1.52	0.53	4.00	5.23	7.70	6.73	20.02	4.55	6.51
Ward Street	Average Daily Flow	64.93	65.49	84.79	79.99	66.55	59.24	60.00	61.03	64.01	64.23	97.17	68.63	69.65
	Dry Day Average Daily Flow	57.04	61.28	79.03	69.71	64.28	54.36	55.40	56.12	55.94	59.20	74.94	59.51	62.23
	Estimated Infiltration	12.54	16.78	34.53	25.21	19.78	9.86	10.90	11.62	11.44	14.70	30.44	15.01	17.73
	Estimated Sanitary Flow	44.50	44.50	44.50	44.50	44.50	44.50	44.50	44.50	44.50	44.50	44.50	44.50	44.50
	Estimated Inflow	7.89	4.21	5.76	10.28	2.27	4.88	4.60	4.91	8.07	5.03	22.23	9.12	7.42
Winthrop Terminal	Average Daily Flow	20.60	20.73	27.13	21.63	17.89	18.30	17.07	20.06	20.09	19.62	30.31	19.34	21.05
	Dry Day Average Daily Flow	15.65	18.60	22.74	17.49	17.72	15.78	14.98	17.65	16.98	16.43	21.14	17.71	17.73
	Estimated Infiltration	5.85	8.80	12.94	7.69	7.92	5.98	5.18	7.85	7.18	6.63	11.34	7.91	7.93
	Estimated Sanitary Flow	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80	9.80
	Estimated Inflow	4.95	2.13	4.39	4.14	0.17	2.52	2.09	2.41	3.11	3.19	9.17	1.63	3.32
Subtotal - Northern Headworks	Average Daily Flow	229.11	240.20	312.42	280.54	222.38	192.61	186.87	199.49	208.37	210.13	357.94	245.03	240.21
	Dry Day Average Daily Flow	183.42	222.92	279.69	241.70	217.81	174.70	168.97	175.10	175.37	182.56	268.44	210.88	208.27
	Estimated Infiltration	61.57	101.07	157.84	119.85	95.96	52.85	47.12	53.25	53.52	60.71	146.59	89.03	86.42
	Estimated Sanitary Flow	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85	121.85
	Estimated Inflow	45.69	17.28	32.73	38.84	4.57	17.91	17.90	24.39	33.00	27.57	89.50	34.15	31.94
Headworks as Reported by NPDES	SUM of ADF's	224.90	235.00	303.50	271.80	213.50	187.60	185.30	199.20	208.40	210.00	357.90	246.40	236.76
Chelsea Creek	Average Daily Flow	102.20	113.70	148.20	132.00	98.50	82.40	79.60	85.90	89.70	92.80	177.40	121.50	110.19
Columbus Park	Average Daily Flow	37.40	35.40	43.60	38.30	31.00	28.40	30.10	32.40	34.80	33.50	53.40	36.60	36.22
Ward Street	Average Daily Flow	64.70	65.20	84.60	79.80	66.10	58.90	58.70	60.80	63.80	64.00	96.80	68.80	69.32
Winthrop Terminal	Average Daily Flow	20.60	20.70	27.10	21.70	17.90	17.90	16.90	20.10	20.10	19.70	30.30	19.50	21.03
Total System Flow (Southern Collection System Plus Northern Headworks)	Raw Average Daily Flow	361.55	385.28	506.85	441.94	342.65	281.29	267.99	283.24	304.38	325.16	580.24	396.28	372.65
	Raw Dry Day Average Daily Flow	281.63	357.85	456.07	387.09	335.33	260.57	246.20	252.82	259.51	285.22	442.80	342.33	325.22
	Raw Estimated Infiltration	105.93	182.15	280.37	211.39	159.63	84.87	70.50	77.12	83.81	109.52	267.10	166.63	149.52
	MWRA Estimated Infiltration	4.77	9.05	12.22	9.74	6.62	4.20	3.12	3.31	3.68	4.94	12.53	8.70	6.88
	Final Average Daily Flow	356.78	376.23	494.63	432.20	336.03	277.09	264.87	279.93	300.70	320.22	567.71	387.58	365.77
	Final Dry Day Average Daily Flow	276.86	348.80	443.85	377.35	328.71	256.37	243.08	249.51	255.83	280.28	430.27	333.63	318.34
	Final Estimated Infiltration	101.16	173.10	268.15	201.65	153.01	80.67	67.38	73.81	80.13	104.58	254.57	157.93	142.64
	Estimated Sanitary Flow	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70	175.70
	Estimated Inflow	79.92	27.43	50.78	54.85	7.32	20.72	21.79	30.42	44.87	39.94	137.44	53.95	47.43

Table 4 - Estimated Community Wastewater Flow Components for 2018										1-Aug-19				PAGE 12		Annual Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
Boston (Total)	Raw Average Daily Flow	105.16	102.32	128.87	116.89	92.61	84.88	86.27	91.46	97.09	96.67	160.27	105.86	105.62		
	Raw Dry Day Average Daily Flow	83.92	95.16	111.61	98.66	89.19	78.36	75.94	77.31	77.47	82.24	107.35	91.58	89.00		
	Raw Estimated Infiltration	25.42	36.66	53.11	40.16	30.69	19.86	17.44	18.81	18.97	23.74	48.85	33.08	30.50		
	MWRA Estimated Infiltration	5.21	8.55	12.23	9.85	6.90	4.55	3.66	3.89	3.93	5.16	12.02	8.05	6.98		
	Final Average Daily Flow	99.95	93.77	116.64	107.04	85.71	80.33	82.61	87.57	93.16	91.51	148.25	97.81	98.64		
	Final Dry Day Average Daily Flow	78.71	86.61	99.38	88.81	82.29	73.81	72.28	73.42	73.54	77.08	95.33	83.53	82.02		
	Final Estimated Infiltration	20.21	28.11	40.88	30.31	23.79	15.31	13.78	14.92	15.04	18.58	36.83	25.03	23.52		
	Estimated Sanitary Flow	58.50	58.50	58.50	58.50	58.50	58.50	58.50	58.50	58.50	58.50	58.50	58.50	58.50		
	Estimated Inflow	21.24	7.16	17.26	18.23	3.42	6.52	10.33	14.15	19.62	14.43	52.92	14.28	16.62		
Brookline (Total)	Raw Average Daily Flow	9.17	9.76	13.12	12.19	8.75	6.40	6.59	6.43	7.30	7.85	16.61	10.47	9.54		
	Raw Dry Day Average Daily Flow	6.55	8.81	11.86	10.40	8.36	5.80	6.09	5.64	6.09	6.76	12.00	8.95	8.10		
	Raw Estimated Infiltration	2.35	4.61	7.66	6.20	4.16	1.60	1.89	1.44	1.89	2.56	7.80	4.75	3.90		
	MWRA Estimated Infiltration	0.01	0.03	0.05	0.04	0.02	0.01	0.01	0.01	0.01	0.01	0.04	0.03	0.02		
	Final Average Daily Flow	9.16	9.73	13.07	12.15	8.73	6.39	6.58	6.42	7.29	7.84	16.57	10.44	9.52		
	Final Dry Day Average Daily Flow	6.54	8.78	11.81	10.36	8.34	5.79	6.08	5.63	6.08	6.75	11.96	8.92	8.08		
	Final Estimated Infiltration	2.34	4.58	7.61	6.16	4.14	1.59	1.88	1.43	1.88	2.55	7.76	4.72	3.88		
	Estimated Sanitary Flow	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20		
	Estimated Inflow	2.62	0.95	1.26	1.79	0.39	0.60	0.50	0.79	1.21	1.09	4.61	1.52	1.44		
Milton (Total)	Average Daily Flow	4.22	4.63	6.40	4.84	3.39	2.16	1.88	2.00	2.54	3.35	7.69	4.67	3.97		
	Dry Day Average Daily Flow	2.84	4.10	5.57	3.98	3.33	2.04	1.81	1.90	2.15	2.87	5.83	3.84	3.35		
	Estimated Infiltration	1.44	2.70	4.17	2.58	1.93	0.64	0.41	0.50	0.75	1.47	4.43	2.44	1.95		
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40		
	Estimated Inflow	1.38	0.53	0.83	0.86	0.06	0.12	0.07	0.10	0.39	0.48	1.86	0.83	0.62		
Newton (Total)	Raw Average Daily Flow	14.82	16.91	23.80	21.59	16.16	11.11	9.63	9.82	9.84	12.18	28.11	21.26	16.25		
	Raw Dry Day Average Daily Flow	11.37	15.66	22.63	19.58	15.51	10.62	9.43	9.18	8.88	10.98	24.51	18.45	14.71		
	Raw Estimated Infiltration	3.57	7.86	14.83	11.78	7.71	2.82	1.63	1.38	1.08	3.18	16.71	10.65	6.91		
	MWRA Estimated Infiltration	0.01	0.01	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.01	0.03	0.02	0.01		
	Final Average Daily Flow	14.81	16.90	23.77	21.57	16.15	11.11	9.63	9.82	9.84	12.17	28.08	21.24	16.24		
	Final Dry Day Average Daily Flow	11.36	15.65	22.60	19.56	15.50	10.62	9.43	9.18	8.88	10.97	24.48	18.43	14.70		
	Final Estimated Infiltration	3.56	7.85	14.80	11.76	7.70	2.82	1.63	1.38	1.08	3.17	16.68	10.63	6.90		
	Estimated Sanitary Flow	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80		
	Estimated Inflow	3.45	1.25	1.17	2.01	0.65	0.49	0.20	0.64	0.96	1.20	3.60	2.81	1.54		

Table 4 - Estimated Community Wastewater Flow Components for 2018													PAGE 13	Annual Average
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(MGD)
Subtotal Northern System CSO Communities Only: [Sum of Boston (North), Cambridge, Chelsea, and Somerville]	Raw Average Daily Flow	113.80	111.60	140.98	127.73	103.87	98.08	102.71	110.02	113.94	110.87	164.74	108.71	117.20
	Raw Dry Day Average Daily Flow	92.48	101.06	118.73	103.27	99.07	86.80	90.23	91.64	89.84	93.65	106.45	91.56	97.04
	Raw Estimated Infiltration	22.28	30.86	48.53	33.07	28.87	16.60	20.03	21.44	19.64	23.45	36.25	21.36	26.84
	MWRA Estimated Infiltration	2.22	2.57	4.83	3.34	2.92	1.71	2.20	2.18	1.98	2.39	3.57	1.69	2.63
	Final Average Daily Flow	111.58	109.03	136.15	124.39	100.95	96.37	100.51	107.84	111.96	108.48	161.17	107.02	114.57
	Final Dry Day Average Daily Flow	90.26	98.49	113.90	99.93	96.15	85.09	88.03	89.46	87.86	91.26	102.88	89.87	94.40
	Final Estimated Infiltration	20.06	28.29	43.70	29.73	25.95	14.89	17.83	19.26	17.66	21.06	32.68	19.67	24.20
	Estimated Sanitary Flow	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20	70.20
	Estimated Inflow	21.32	10.54	22.25	24.46	4.80	11.28	12.48	18.38	24.10	17.22	58.29	17.15	20.17
Subtotal Northern System Without North CSO Communities:	Raw Average Daily Flow	102.20	116.61	152.62	135.86	103.67	78.27	74.06	78.21	82.26	90.91	174.47	124.61	109.33
	Raw Dry Day Average Daily Flow	81.41	108.23	145.13	123.48	99.99	73.71	70.56	72.65	73.63	83.14	147.63	107.54	98.79
	Raw Estimated Infiltration	29.76	56.58	93.48	71.83	48.34	22.06	18.91	21.00	21.98	31.49	95.98	55.89	47.14
	MWRA Estimated Infiltration	1.75	3.33	5.61	4.32	2.78	1.27	1.11	1.22	1.26	1.79	5.77	3.25	2.78
	Final Average Daily Flow	100.45	113.28	147.01	131.54	100.89	77.00	72.95	76.99	81.00	89.12	168.70	121.36	106.55
	Final Dry Day Average Daily Flow	79.66	104.90	139.52	119.16	97.21	72.44	69.45	71.43	72.37	81.35	141.86	104.29	96.01
	Final Estimated Infiltration	28.01	53.25	87.87	67.51	45.56	20.79	17.80	19.78	20.72	29.70	90.21	52.64	44.36
	Estimated Sanitary Flow	51.65	51.65	51.65	51.65	51.65	51.65	51.65	51.65	51.65	51.65	51.65	51.65	51.65
	Estimated Inflow	20.79	8.38	7.49	12.38	3.68	4.56	3.50	5.56	8.63	7.77	26.84	17.07	10.54
Subtotal North/South Systems Without North CSO Communities:	Raw Average Daily Flow	234.64	261.69	347.05	297.26	223.94	166.95	155.18	161.96	178.27	205.94	396.77	275.86	241.77
	Raw Dry Day Average Daily Flow	179.62	243.16	321.51	268.87	217.51	159.58	147.79	150.37	157.77	185.80	321.99	238.99	215.74
	Raw Estimated Infiltration	74.12	137.66	216.01	163.37	112.01	54.08	42.29	44.87	52.27	80.30	216.49	133.49	110.24
	MWRA Estimated Infiltration	6.52	12.38	17.83	14.06	9.40	5.47	4.23	4.53	4.94	6.73	18.30	11.95	9.66
	Final Average Daily Flow	228.12	249.31	329.22	283.20	214.54	161.48	150.95	157.43	173.33	199.21	378.47	263.91	232.11
	Final Dry Day Average Daily Flow	173.10	230.78	303.68	254.81	208.11	154.11	143.56	145.84	152.83	179.07	303.69	227.04	206.08
	Final Estimated Infiltration	67.60	125.28	198.18	149.31	102.61	48.61	38.06	40.34	47.33	73.57	198.19	121.54	100.58
	Estimated Sanitary Flow	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50
	Estimated Inflow	55.02	18.53	25.54	28.39	6.43	7.37	7.39	11.59	20.50	20.14	74.78	36.87	26.03